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In This Issue—*An Ounce of Prevention*

MOTOR AGE

Volume XXXIX
Number 16

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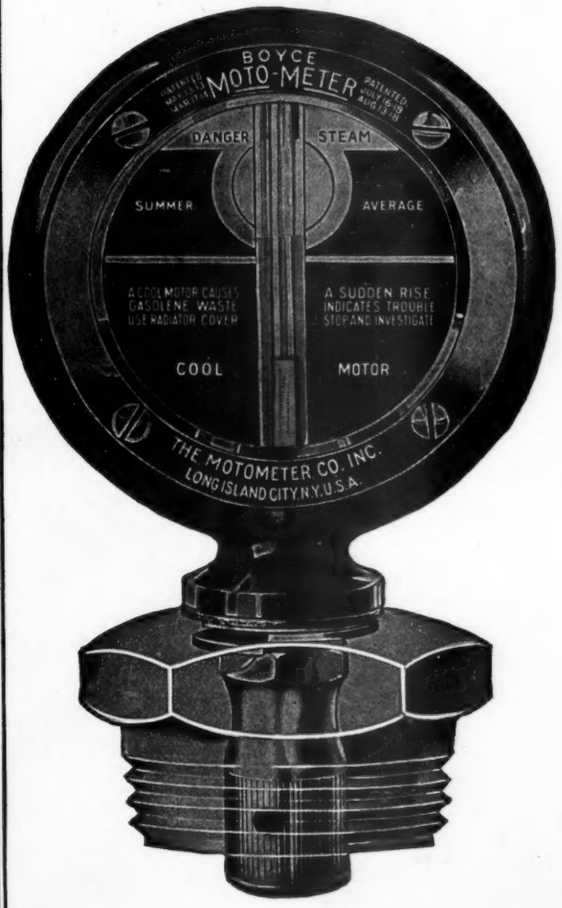

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MOTOR AGE

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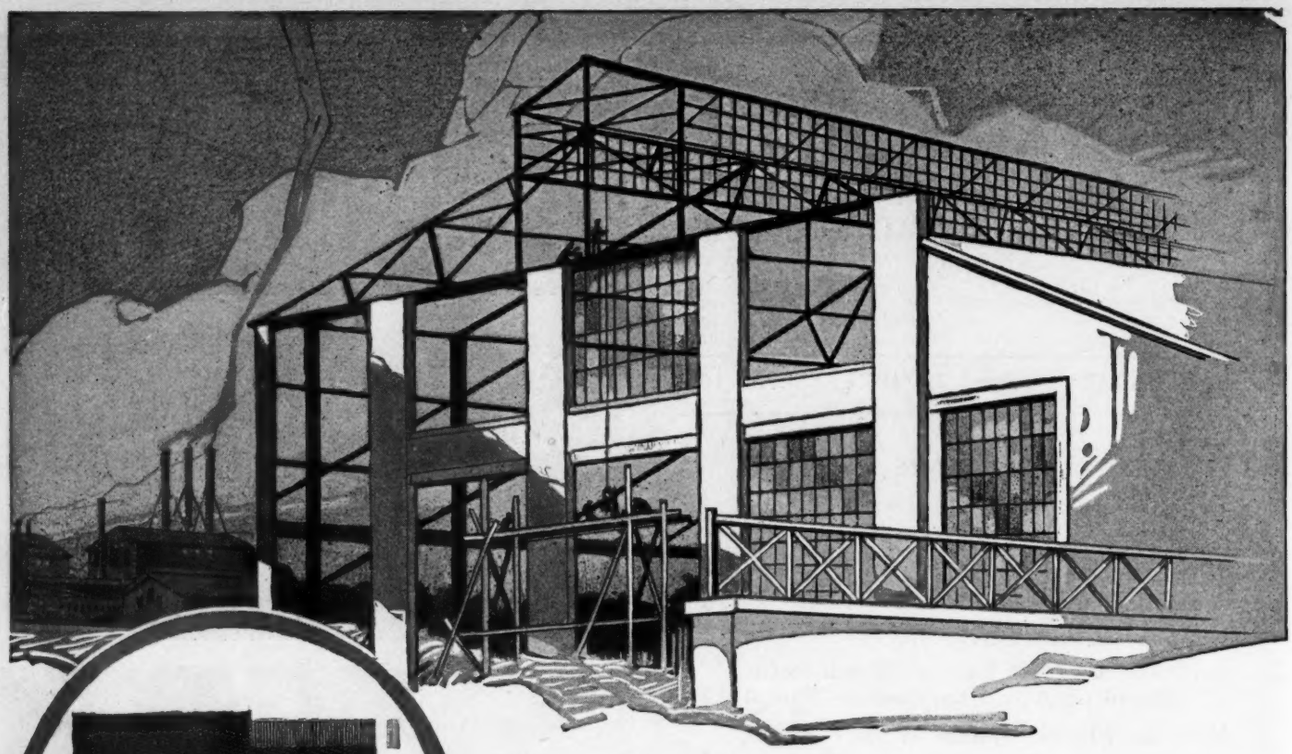

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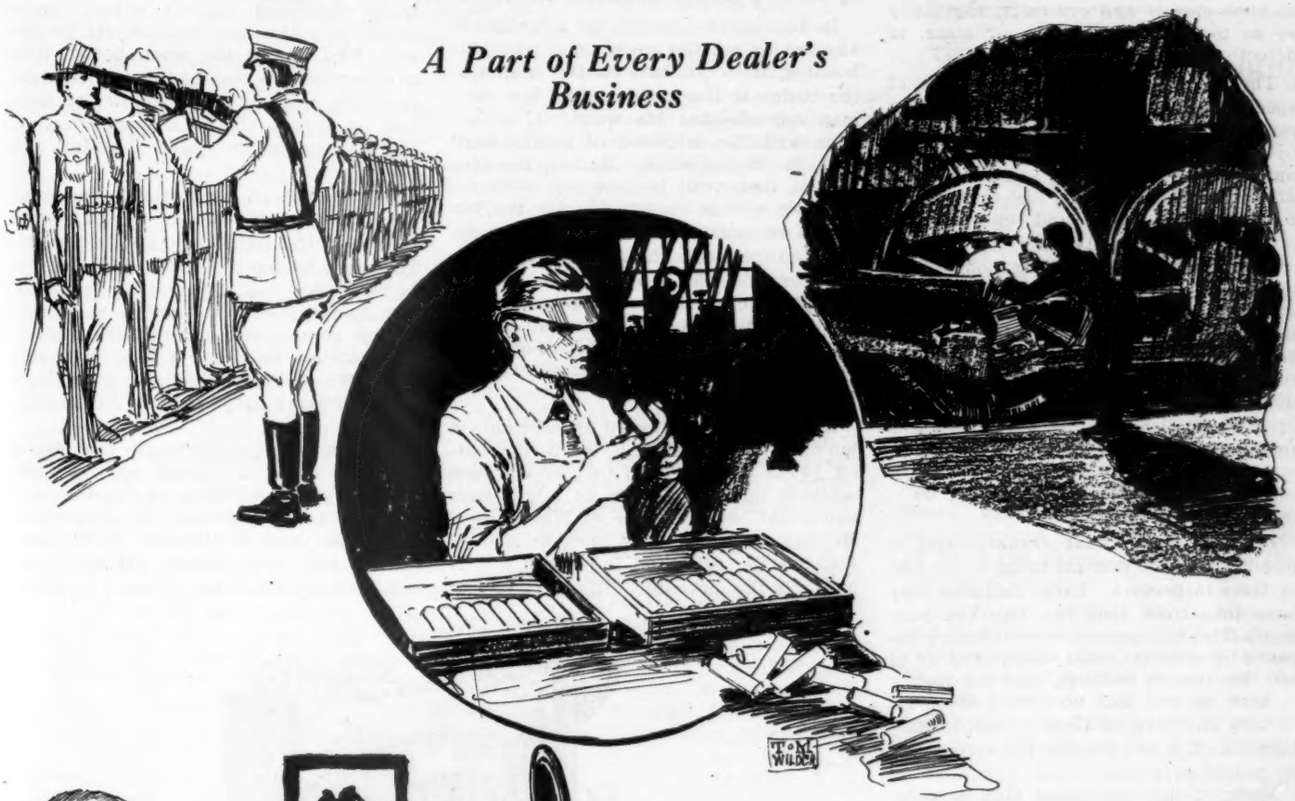
MOTOR AGE

INSPECTION

A Part of Every Dealer's Business



EVER notice how carefully a locomotive engineer inspects his engine before a run and after a run? Also, how the young lady looks herself over in the mirror after she has applied the powder, and how the army officer looks over the rookies? Then again, if you ever have been in a motor car factory you will recall how carefully the material which goes into the manufacture of cars is inspected. Why all this inspection? The answer is simple—to make sure everything is right, and knowing everything is right is one of the most essential things in the automotive dealer's business today. You must know, for example, that every lock washer and cotter pin is in place on the inside of an engine to be sure that that job is going to "stay put" and prove a liability by the car coming back into the shop with a hole punched through the crankcase because a rod let go. The next two pages tell in detail of inspection that is necessary in every motor car dealer's business.

That Ounce *of* Prevention

It Is Far Better to Spend a Few Minutes Inspecting a Job to See That It Is Right Than to Have to Spend Several Hours Later on Doing the Work Over Again—Inspection Is One Sure Way of Helping the Cash Register of the Service Station

By B. M. Ikert

WE can only tell the value of any piece of material or the relative worth of several pieces of material by inspection. Inspection, the dictionary tells us, means "to look upon; to view closely and critically, especially so as to ascertain quality, or state, to detect errors, etc."

The part of this definition that is of special value to a business man is that referring to looking closely and critically to ascertain quality and errors. It is only by detecting quality and errors that any business is built up, and this applies to the service station and repairshop as much as it does to any other.

Take the job of auditing books. No concern of any consequence today would think of operating its business without having an accountant go over the books regularly. It is the job of the accountant to check up what the other fellow has done. He is the one to discover the errors and also the one who ascertains the quality of the account.

BIG MAKERS KNOW ECONOMY OF INSPECTION

In any factory that manufactures a product it is the general thing to see one or more inspectors. Large factories may have inspectors that run into the hundreds. These inspectors are necessary because the product must be checked up to see that it runs uniform, that the quality is kept up and that no errors creep in. If they do creep in there is ample time to ward off a loss because the errors will be caught in time.

Much of the unpleasant side of automotive service and repair work can be lightened up quite a bit if there is a proper system of inspection. It is logical that there should be a rigid inspection in the service station and shop. Why should our metallurgists go to all the trouble to give us good steels and why should our factories maintain rigid inspection departments to see that the product goes out right only to have the product fail on the road because some careless mechanic neglected to put a cotter pin on a connecting rod cap and that rod punched a hole through the crankcase? Someone should have checked that rod.

Of course, large service stations can afford a much more complete staff of mechanics ranging from the common grease hound to the master mechanic. In such shops either the master mechanic or his assistant should be the one to check up the work the others have done. One of the largest service stations in the country located in California maintains an inspection system that has built up its service to a wonderful extent.

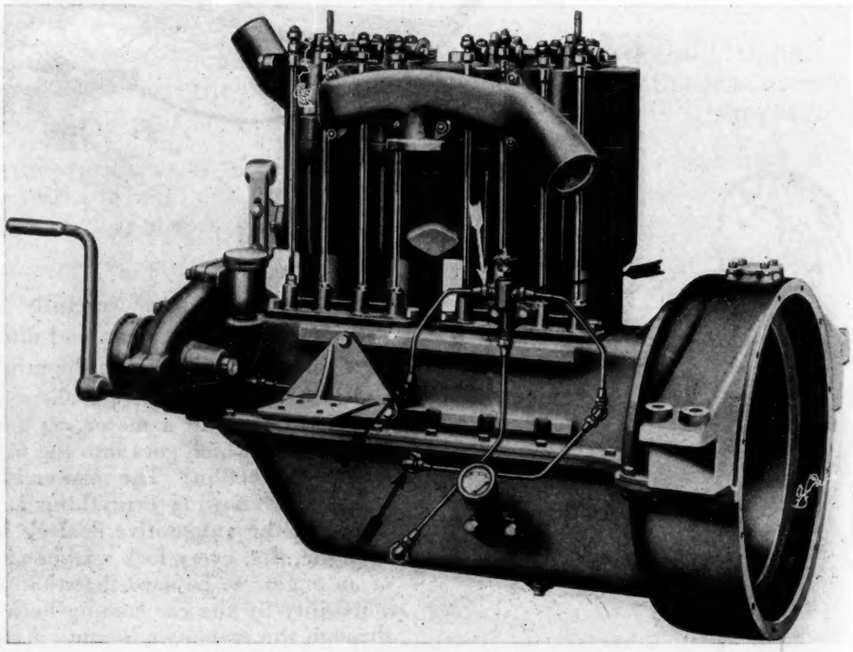
In this service station no mechanic is allowed to put the cover on a rear axle housing, the crankcase on the engine or the clutch in the housing until the foreman has checked his work. It is not done with the intention of finding fault with the man's work. Rather, the idea is that there will be just one man, the foreman who is responsible for the job. He, of course, calls attention to any defects, so the mechanic does not repeat his mistake, but the real thought is that should the customer come back and complain about the job, the foreman can be consulted and there will be no question as to whether the mechanic did this or that.

A mechanic if allowed to assemble a job on his own hook will, when confronted, swear up and down that he put lock washers on a job, when he might have and might not have done so. Who knows? He may be honest, and most mechanics are, but the reflection is on him. It is unfair to the mechanic. His work should be checked so that he can be given a clean slate when occasion demands.

A good system of inspection is one of the most valuable things a dealer can have to help his business. It does not mean additional expense either. In a small shop the inspector should be the man who knows the work better than anyone else. He may be the service manager, the shop foreman, the dealer himself, or anyone else in the organization, just so long as he knows the stuff and can check it.

Men do not all work alike. One may set up a set of bearings or connecting rods and feel that they are just right. They may be too tight or too lose. How do we know? But, if we let Mr. Inspector who knows just how bearings should be set up, come along and feel the amount of clearance in them, it is a lead pipe cinch the job is not likely to come back with a bearing burnt out or a hammering engine.

Oftentimes little details are overlooked that may result in disaster later on. We recall a case wherein an engine was taken down and overhauled after which it was put back in the car. It had new pistons and rings and the cylinders also had been rebored. All the work had been



If the connections on the oil pump of this engine, shown by the arrows, are not properly made, serious damage will result. It is a detail, but if not carried out right and properly inspected, away goes the profit on the job, and maybe more

done in good shape, excepting that the brass lock nut on the oil pipe had not been tightened and instead of the oil pump pumping oil it was sucking air. No one checked the oil gage on the dash and everything was taken to be all right until the owner telephoned in from several miles out that his engine would not turn over and seemed awfully hot. A frozen engine, of course.

When they got the car back in the service station and started the "inspection" the loose oil pipe connection was found. It was an incident that could not be hung on the owner and the shop had to stand the loss of doing the work all over again. Just one little glance by the inspector at the oil gage would have headed off the trouble and loss to the shop.

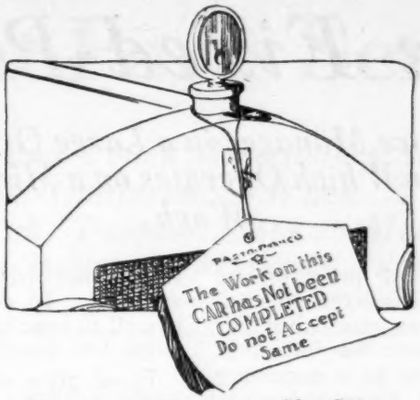
Many dealers have good systems for inspecting new cars and MOTOR AGE told of some of these in previous issues. One system that is working out very well is that used by the Southern Oakland Co., Atlanta, Ga. Here is what A. G. Prosperi, service manager, says about it:

"When we receive new cars from the factory a tag is placed on them by the unloading crew which reads as follows: 'The work on this car has not been completed, do not accept same.'"

It is utterly impossible to remove this tag from the car, until it has gone through our shop, been thoroughly inspected, tuned up and tested by the head tester. He is the only man who has authority to remove this tag. When he does take it off he places on the car his own tag which reads "Inspected and Passed." The tester's name is signed to this tag also.

This overcomes all trouble with the delivery of new cars, as we can centralize and hold one man responsible for the condition in which new cars are delivered. Every man in our organization has instructions not to deliver a car unless it bears the inspector's tag. This method also is used in repairing cars or in service work.

When an owner brings a car to us he, of course, has made the best diagnosis he can, but nine times out of ten he is wrong. When an owner approaches our service station he is met by a service salesman or superintendent who talks to him and if there is no question about the proper diagnosis of the trouble the car is sent to the shop with the proper job card. Otherwise the inspector is sent out with the owner and when the car comes back the inspector makes the diagnosis and in many cases he points out additional work which is necessary on that car and which the customer has overlooked. In this way we are able to get work for the shop, and we also are able to keep the customer's car operating much better.



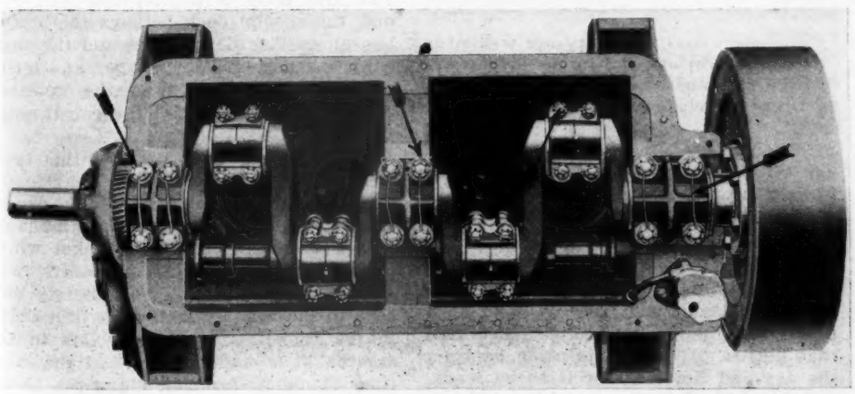
One concern hangs a tag like this on all the cars that are not ready for the customer. It shows the car must first be inspected

This inspector's name goes on the job card when the car is sent to the shop and the card also bears the license number, the number of miles the car has gone, its general condition, the tools checked, etc. The tools are checked and also the equipment so that there will be no argument about what goes with the car when it is delivered later.

After the repairs have been made the mechanic who did the job brings the car to the ground floor of the service station and he, together with the head inspector, take the car out. If the work has been done satisfactorily, that is, if it meets with the approval of the inspector the mechanic is released immediately for another job. If the work is not passed by the inspector the car must be returned to the shop and the work which the inspector directs be done before the mechanic can go to another job."

Oftentimes you will find cars parked on the outside of a service station and the owners of these cars take it for granted they are in shape to drive them away only to come to grief later on. To avoid this condition the company mentioned above uses the same tag "Do not accept same, the work has not been completed" on these cars. No owner who reads a tag of this kind is apt to drive away a car.

This business of inspection can be carried as far as one likes, depending as mentioned before upon the size and facilities of the organization, but every service station big or little should have some way of guarding against errors. Detecting errors in time means happiness to everybody and what is more importan. to the dealer—money in his pocket.



Note the lock wires and cotter pins on the main and connecting rods of this engine. If these are not inspected before the crankcase is put on trouble may follow later and the shop probably will be blamed for poor work

What "Pirate" Should Mean

THE term "pirate" has been freely used in the automotive industry, particularly with reference to the makers of parts. A word of explanation and a suggestion for the guidance for those who are to converse further on the subject may be of service.

The whole discussion arises from the fact that certain manufacturers make parts which, in maintenance work, are used in place of parts which might be bought from the maker of the car or his dealer. Here should come a division on the subject of "piracy."

Some of these parts, which might better be called, if anything, "substitute parts," are as good as the originals and in some cases better. Some have back of them the names and trade-marks of reputable houses.

Others are inferior to the originals and do harm when installed in the apparatus of which they are made a part. They are often palmed off as high grade —when they are NOT. It is this part which does the damage and it is ONLY this part which should be called "pirate."

For good, high-grade parts there is a certain field under present conditions, as is evidenced by the fact that the business has become big. And on this business has fastened itself a parasitical class which endeavors to make a money profit through the ignorance of the buyer.

There should be no doubt as to what a "pirate" is in the parts business, despite the fact that in its early history the word referred only to a merchant who traded in places where some one, properly or otherwise, had forbidden him to operate.

And—the elimination of the word entirely and the adoption of more suitable terms would be a service to the industry, provided any one can coin the proper terms. Anyway, it is pretty much a point of view of the user of the term, and the point of view of MOTOR AGE is as here set forth.

A Simple Fixed-Price Plan

How the Service Manager in a Large Organization Has Evolved a Plan Which Operates on a Minimum of Paper Work

IN our previous discussions of fixed price service systems we have necessarily considered institutions where the service system was established for operation in a large organization where the volume of business was very large. It seems to be a necessary part of our present-day scheme of doing things to create paper work and countless records all of which require a large clerical force to keep going.

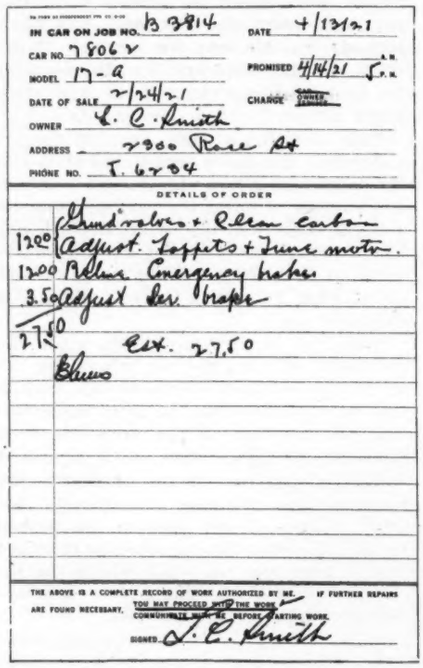
It also seems to be a fact that a company which at first is nothing more or less than a one man organization passes through a certain stage where it can no longer remain a one man concern, and from this point on it develops into an organization with all its ramified departments. If it would be possible to retain the simplicity in our large organizations that characterizes our small concerns, a goodly sum of money would be saved annually. In considering flat rate service systems it is well to bear in mind that the more simple the system is the less money will be spent in its upkeep.

Fixed price or flat rate service systems necessarily will be found in the large cities first, because it is in the large city that volume business is done and very often the dealer in the large city handles only one make of car, all of which tends toward an easier adoption of the fixed price service system. To find a system in force by a big dealer in a large city that characterizes the simplicity of the small concern is, we consider, a find indeed and we therefore present the system of the Louis Geyler Co., Chicago, Dort dealer and distributor, as worked out by Mr. Schnosenberg, Service Manager.

THERE is a very limited number of forms used in the system, but this is after all not the most important thing in the operation of the service department. After all the forms are but a means to the ultimate end, which is satisfaction to the owner. It is interesting to digress here for a moment to tell of the manner in which this fixed price system was evolved. In the first place Mr. Schnosenberg was one of the live wire salesmen of the sales force of the place. He was continually kicking about the manner in which his new car customers were being treated by the service department and the dealer, Mr. Geyler, it is our understanding, told Mr. Schnosenberg that the best thing for him to do was to take over the service department and organize it on any basis that he saw fit in order to eliminate the dissatisfaction of the customers.

Accordingly the then newly elected service manager planned what he thought was a genuine merchandising system for the dispensing of service. How well he succeeded is attested to by the fact that the service department now runs like the proverbial clock and owner complaints are very rare, but of course complaints have not been entirely eliminated for there are people of this earth who will kick when every possible source of complaint has been removed, simply because there is nothing left to kick about.

The operation of the system is as follows: The owner drives his car to the service station and is met there by the service salesman. If the owner is absolutely set in his mind as to just what he wants done to the car the salesman writes up a ticket accordingly and from the standard price book determines just what the cost is to be. This amount is written on the ticket and if everything is satisfactory the owner signs this ticket. The owner is given a claim check and a promise is made as to when the car will be ready. This date by the way is written on the ticket.



IN CAR ON JOB NO. 13 3814 DATE 4/13/21
CAR NO. 7806 V PROMISED 4/14/21 5 P.M.
MODEL 17-A CHARGE
DATE OF SALE 2/24/21
OWNER L. C. Smith
ADDRESS 2300 Rose Av
PHONE NO. T. 6284

DETAILS OF ORDER

1.20 Grind valves + clean carbon
1.20 adjust. Toppets + tune motor.
1.20 Relines Emergency brakes
3.50 Adjust Rear brakes
27.50
Est. 27.50
Blues

THE ABOVE IS A COMPLETE RECORD OF WORK AUTHORIZED BY ME. IF FURTHER REPAIRS ARE FOUND NECESSARY, YOU MAY PROCEED WITH THE WORK / COMMUNICATE WITH ME BEFORE STARTING WORK.
SIGNED L. C. Smith

The operations necessary are written on this form and the prices obtained from the standard price book. The owner then signs at the bottom

So far as concerns the owner he is now done with the car. He knows that the car is in the hands of the service station where certain things have been guaranteed to be done and these things at a price that he knows beforehand. All that he has to do now is come back on the day and time the car is to be ready, pay his bill if it is a cash-on-delivery proposition and take his car.

It is the old story of selling satisfaction through the service department by giving the owner an acccurate idea as to what the cost is going to be and when delivery is going to be made.

If the work in relining the brakes is fully explained it is much easier for him to comprehend the reasons for the charge. For example, the owner very seldom realizes that the wheels must be removed when the brakes are relined. It has been found therefore that the best thing to do is to write the routine of the service operations on the ticket.

The explanation of the routine followed by the forms need be very brief inasmuch there are few forms used and their handling is also very simple. After the owner signs the job ticket, it is dispatched to the credit manager through a carrier. The credit manager examines the ticket and stamps it C. O. D. or Charge or whatever is necessary. Of course where the dealer runs his service system on a strictly cash basis this step would be unnecessary. The job ticket is returned immediately to the service department where a typewritten copy is made. This copy is made in triplicate. The first copy is the bookkeeper's record, the second copy belongs to the follow-up service department and the third copy is made on heavy paper and is the copy that is inserted in the celluloid folder that accompanies the car through the shop.

The first and third copy of this typewritten order for the job is sent to the floor or department where the car is sent. The department or shop manager places the car ticket in a basket which is kept empty by the mechanics who when finishing one job immediately proceed to the next by taking the first ticket in the basket and securing this to the car that it is made out for. At the same time the shop foreman stamps a ticket with the electric shop recorder and this gives an accurate record of just how

(Concluded on page 49)

Harmony at Parts Service Meet

Manufacturers and Truck Assemblers Show Spirit of Cooperation at Conference When Committee Is Appointed to Take Further Steps to Meet Situation—Lack of Adequate Methods Admitted

DETROIT, April 12—Confidence in the successful outcome of conferences between passenger car and truck assemblers and parts manufacturers looking to some compromise plan for parts servicing that will solve the problem of service with fairness to all concerned, was expressed by many assemblers and parts makers who attended the open meeting of the Motor Truck Manufacturers' Association here today. While lengthy discussion developed no point of contact indicating a compromise position and resulted in an apparent deadlock, the spirit of harmony which prevailed gave evidence of a willingness of all interests to cooperate.

At the conclusion of the open discussion the meeting adjourned with the appointment of a committee of five from the truck association and a similar committee representing the parts makers for joint discussion and efforts to formulate some plan to which all may subscribe. The committees are expected to begin work immediately and the next meeting of the assemblers and parts makers will be held when the joint committee signifies its readiness to report.

The committee named by President B. A. Gramm of the truck association is composed of M. L. Pulcher, general manager, Federal, chairman; and M. Cook, general manager, Service; J. W. Stephenson, vice president, Indiana Truck Corp.; Col. F. E. Smith, vice president, Republic and E. A. Williams. Vice President G. W. Yeoman of Continental Motor Corp., who is regarded as sponsor for the service station plan, named L. M. Viles, vice president, The Buda Co., William Mack, sales manager, Borg & Beck; Fred Glover, vice president, Timken-Detroit Axle Co.; H. L. Horning, general manager Waukesha Motor Co., and himself to represent the parts makers. The joint committee was instructed to use its discretion as to inviting representatives of the National Automobile Dealers' Association or others interested to participate in the committee deliberations.

ENDEAVOR TO KEEP SPIRIT OF HARMONY

Throughout the meeting there was an evident inclination to inject a spirit of harmony and sympathy for any plan that might be offered that would solve the service problem without too great concessions from either side was expressed by all who participated in the discussion. That there would be no suggestion offered looking to a compromise agreement became evident as the discussion progressed however and in the hope that more careful analysis in committee conferences might develop some common ground from which to work A. J. Whipple, sales manager of Republic Truck Co., offered the motion providing for the joint committee.

THE unanimity of opinion as regards the desire for improvement in service methods, between the passenger car and truck assemblers and parts manufacturrs, augurs well for the future of the industry in the feeling of confidence that will be engendered in the minds of the ultimate public. Lack of adequate service admittedly has been the deterrent factor in the competition of the assembled product and that manufactured entirely within the factory. In the final analysis the dealer must be considered as the point of contact between manufacturer, parts maker and customer.

Underlying all the discussion there was the agreement that there must be greater effort put forth in developing a method of servicing assembled cars and trucks that will be adequate. Members of the truck association admitted inefficiency of the present system and expressed willingness to enter into any arrangement that might have a tendency toward improvement insofar as such arrangement did not impose added burden on the dealer and in consequence disrupt their dealer organizations. Truck manufacturers took the position that dealers must have the revenue from service if they are to continue in business and gave assurance that pressure would be brought to bear to insure quick, efficient and economical service to the owner. The burden of the arguments from the assembler's end, however, was unqualified and unalterable opposition to the plan espoused by the parts makers.

The attitude of the parts makers was similar in that they expressed themselves as willing and anxious to participate in any plan that would guarantee proper servicing of their products. That the goal could not be achieved through the medium of dealers, however, formed the basis of their argument and their conviction that through the parts depot alone could the result hoped for be brought about was apparent in their statements.

Possibilities of a compromise plan were discussed freely by truck men and parts makers after the meeting. One solution offered by a parts manufacturer provides for cooperative parts servicing stations maintained by dealers and appeared to be looked upon as worthy of consideration. No suggestion along that line was made during the meeting and while some few truck manufacturers were found leaning toward it opinions were expressed indicating that such plan would not find favor with the larger assemblers.

At all events the unanimity of opinion as regards the desire for improvement in service methods augurs well for the future of the industry in the feeling of confidence that will be engendered in the mind of the ultimate consumer. All agree that adequate servicing of assembled products will prove a most important step in sales development in that it will convince the consumer that his best interests lie in the purchase of an assembled car or truck. Lack of adequate service admittedly has been the deterrent factor in competiiton of the assembled product and that manufactured entirely within one factory.

PRESENTS REASONS FOR DEALER OPPOSITION

Following a recess of two hours after the meeting was called to order by President Gramm, during which committees from the truck association and the parts makers outlined suggestions to be offered at the open meeting, the afternoon session was called to order and Mr. Horning read a set of resolutions adopted by the parts makers' committee. A statement of the position of the truck manufacturers was made by General Manager David Thomas of the truck association but no action was taken on either and they were not included in the minutes of the meeting. A suggestion that further effort looking to an agreed plan be left to a joint committee without further discussion was opposed by M. Cook and on his motion it was decided to hear full discussion before adjournment in order that committees that might be appointed could be guided by the thoughts expressed.

Mr. Pulcher opposing the service station plan said he kad a grip full of communications from dealers opposing it. He declared the parts maker have done nothing for the dealers whereas the truck manufacturer had taken care of

Concluded on page 22

An Analysis of the Farmer's Truck Needs Based on Actual Experience

In Four Parts—Part II—Save Them. *Dealers will find profitable use for this information from 753 reports from farmer truck owners, compiled by H. R. Tolley, scientific assistant, and L. M. Church, assistant in farm accounting of the United States Department of Agriculture.*

HAULING ON THE FARM WITH TRUCKS

OF 416 men who reported on the use of their trucks for hauling on the farm, that is, in the fields and around the buildings, 294, or more than 70 per cent, stated that they do not use their trucks at all for such work. The reasons for not using the truck for hauling on the farm were not given in every case, but a large number stated that their trucks were not suitable for such work. The smaller trucks in many cases will not carry as large loads as it is desired to haul, often the truck cannot obtain traction in the fields, and sometimes the body with which it is equipped is not suitable for some of the hauling on the farm.

Many others stated that they used their horses for all hauling on the farm because there was no advantage in using the truck for such work. Most of the time required for hauling on the farm is taken up with loading and unloading, and the percentage of the total time which will be saved by the truck when used for such work is small as compared with the time it will save in road hauling. When there are horses on the farm which would otherwise be idle, it would naturally be more profitable to use the horses and let the truck stand idle if there is no advantage in time saved or convenience in using it.

The reasons for using their trucks, as given by 122 men who reported that they did some hauling on their farms with their trucks, are summarized in Table X. Practically all of this hauling was either crops or fertilizer, including lime and manure. The average length of haul for 94 of these men who reported on hauling crops was 148 rods, and for 40 who reported hauling fertilizer it was 149 rods. The average size of all the farms included is only 173 acres (see Table 1), and 149 rods is considerably greater than the average distance which crops and fertilizer are usually hauled on such farms.

TABLE X.—*Reasons for using truck for hauling on the farm.*

Reason for using truck.	Number reporting.	Per cent of total.
Time saved	78	64
Convenience	22	18
Horses busy	13	11
Other	9	7

Sixty-four per cent of the 122 men reporting gave the saving of time as the reason for using their trucks for this work. A truck will save some time over horses on hauls of this distance if the truck body is suitable for carrying the material to be hauled, and if there is no difficulty in obtaining traction in the fields. It may also save time to use the truck when only one or two loads are to be hauled, and the horses and wagons are not ready for use.

Eighteen per cent reported that they used their trucks for hauling on their farms because it was more convenient than to use their horses. There is some hauling on the farms where frequent stops must be made, or where the horses or truck must be left without attention for a considerable length of time. In such cases it may be preferable to use the truck even though the horses are allowed to remain idle and the use of the truck does not save any time.

The men who do use their trucks for hauling on the farm reported hauling only an average of 45 tons of crops and 37 tons of fertilizer per year (including lime and manure) with them, while the average amount of crops hauled to market per year with trucks for all farms is 119 tons, and the average amount of fertilizer hauled on the road with trucks is 55 tons per year. Thus, even the comparatively small number of men who use their trucks for hauling on the farm still use their horses for a goodly share of such work.

CUSTOM HAULING

While all the men whose reports are included use their trucks primarily for hauling to and from their own farms, about 28 per cent reported that they did some custom work during the year preceding the time of reporting. Of 492 farmers who reported concerning custom work 355 said that during the past year they had done none whatever. The remaining 137 had received on the average $174 for such work. The number of men who reported hauling different materials, and the price which they received per ton-mile, are given in Table XI.

TABLE XI.—*Returns for custom work.*

Material.	Number of reports.	Price per ton-mile.
Crops	60	$0.37
Milk	6	.69
Feed	6	.39
Fertilizer	6	.28
Other	71	.48

About 30 per cent of these men who had done custom work stated that it had not been profitable. Many of them stated that the main reason for doing custom work was to accommodate their neighbors, and ordinarily in such cases the price was not high enough to make the work profitable. Most of the custom work reported was done by men owning large or medium sized trucks. Only seven of the men who own half-ton trucks reported that they did any custom work, and the average amount received by the seven for the work which they did during the past year was $53.

EFFECT OF DIFFERENT KINDS OF ROADS ON USE OF TRUCKS

It has been shown that the majority of these farmers considered poor roads the greatest disadvantage in the use of a motor truck, and that most of those who still use horses for part of their road hauling do so because of poor roads. In order to gain a more definite idea of the effect of the kind of roads on the use of motor trucks, each farmer was asked to specify the kind of roads over which his truck traveled and the number of weeks during the past year the roads had been in such condition on account of mud or snow that the truck could not be used.

All kinds of roads, fron, unimproved dirt roads to high-class State highways, were reported. Twenty-nine per cent of the men who reported on this point stated that their trucks ordinarily travel only on dirt roads, 46 per cent stated that the roads which they ordinarily use are part dirt and part improved roads and the remainder stated that they have all improved roads, either macadam, gravel, or better. Of course, snow may make even the best of roads impassable for a truck, and this must be remembered in interpreting these figures.

The exact number of men with different kinds of roads and the number of weeks they could not use their trucks is as follows:

Of 187 men with dirt roads only—
17 were able to use their trucks every week in the year.
36 were unable to use them for 1 to 4 weeks in the year.
32 were unable to use them for 5 to 8 weeks in the year.
38 were unable to use them for 9 to 12 weeks in the year.
24 were unable to use them for 13 to 16 weeks in the year
19 were unable to use them for 17 to 20 weeks in the year.
21 were unable to use them for 21 weeks and over.

Of 298 men with roads partly improved—
62 were able to use their trucks every week in the year.
68 were unable to use them for 1 to 4 weeks in the year.
59 were unable to use them for 5 to 8 weeks in the year.
43 were unable to use them for 9 to 12 weeks in the year.
30 were unable to use them for 13 to 16 weeks in the year.
20 were unable to use them for 17 to 20 weeks in the year.
16 were unable to use them for 21 weeks and over.

Of 159 men with improved roads only—
78 were able to use their trucks every week in the year.
38 were unable to use them for 1 to 4 weeks in the year.
19 were unable to use them for 5 to 8 weeks in the year.
16 were unable to use them for 9 to 12 weeks in the year.
5 were unable to use them for 13 to 16 weeks in the year.
1 was unable to use it for 17 to 20 weeks in the year.
2 were unable to use them for 21 weeks and over.

On the average, there were 10.7 weeks when the men with all-dirt roads could not use their trucks, 7.8 weeks when those with part-dirt roads could not use them, and 3.5 weeks when those with wholly improved roads could not.

In all, less than 25 per cent of the men found it possible to use their trucks every week in the year, and between 35 and 40 per cent reported that there were more than 8 weeks during the year when they could not use their trucks. About one-half of the men with wholly improved roads stated that they could use their trucks any time during the year, but only 9 per cent of those with all-dirt roads were able to do so, and there were more than 8 weeks during the year when 55 per cent of these men with all-dirt roads were unable to use their trucks.

Snow was doubtless the main factor in making the roads impassable for the 81 men who have improved roads only but who found there was at least one week during the year when they were not able to use their tracks.

The kind of tires with which the trucks were equipped apparently has little to do with the amount of time which they can not be used on account of the roads. That there was no apparent relation between the character of the roads and the different kinds of tires, and no great difference in the length of time during which the condition of the roads prevented use of trucks with different kinds of tires, is shown by the following;

Of 222 owners of pneumatic-tired trucks—
69 have all-dirt roads.
96 have part-dirt roads.
57 have no dirt roads.
On the average there were 7.9 weeks during the year when the condition of the roads prohibited the use of the trucks.

Of 211 owners of solid-tired trucks—
47 have all-dirt roads.
98 have part-dirt roads.
66 have no dirt roads.
On the average there were 6.4 weeks during the year when the condition of the roads prohibited the use of the trucks.

Of 211 owners of trucks with pneumatic tires in front and solid tires behind—
71 have all-dirt roads.
104 have part-dirt roads.
36 have no dirt roads.
On the average there were 8.6 weeks during the year when the condition of the roads prohibited the use of the trucks.

Seven out of 69 men whose trucks are equipped with pneumatic tires and who have dirt roads only, and 4 out of 47 whose trucks are equipped with solid tires and who have dirt roads only, stated that there was less than a week during the year in which they could not use their trucks. The time during which the pneumatic-tired trucks with all-dirt roads could not be used was practically the same as for the solid-tired trucks with dirt roads only, the average being between 10 and 11 weeks in each case.

It does not necessarily follow that horses were always used for hauling when the roads were in such a condition that the trucks could not be used, as on at least a part of these farms there was no hauling which it was necessary to do at such times.

CHANGE OF MARKET

Each truck owner was asked to give the name of the town where his produce was usually marketed before the purchase of the truck, and its distance from the farm. He was also asked to give the name of the town where the produce hauled by the truck is usually marketed and its distance from the farm. Answers of 704 men to these questions show that about one-fourth of them have changed their markets since purchasing their trucks. The exact number of men on each type of farm who answered the questions concerning their markets, the number who changed markets, and the average distance to the new markets is given in Table XII.

TABLE XII.—*Change of market after purchase of motor trucks.*

Type of farming.	Number reporting.	Number who changed market.	Average distance to new market.
			Miles.
Truck	139	31	18
Dairy	119	18	16
Fruit	102	23	27
Crop	44	12	22
General	300	88	19
All	704	172	20

A somewhat smaller percentage of dairy farmers than of any other type changed their markets. When milk is hauled to a condensery or to a station for shipment it is not often that one market or station is enough better than another to warrant a change.

A large percentage of these men who have changed their markets stated that they did so because the new market was better than the old one. A few, however, stated that they changed for other reasons, several saying that the better roads between their farms and the markets they are now using were responsible for the change. It should be remembered that a considerable number of the men who have not changed their markets were using first-class markets before purchasing their trucks.

The fact that a man has changed his market does not necessarily mean that all his produce is hauled to the new market, or that he purchases all the material for his farm at the new market. In fact, a considerable number of these men who usually market their produce at a different place than before purchasing their trucks reported that they still haul some material either to or from the old markets.

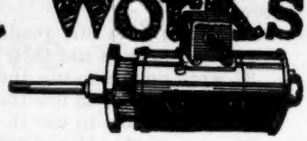
The distances from 156 of these farms to the markets which they used before buying their trucks, and the distances to the markets which they are now using are as follows:

Of 64 men who formerly used markets 1 to 4 miles distant—
2 now use markets 1 to 4 miles distant.
17 now use markets 5 to 9 miles distant.
14 now use markets 10 to 14 miles distant.
15 now use markets 15 to 19 miles distant.
10 now use markets 20 to 24 miles distant.
3 now use markets 25 to 29 miles distant.
3 now use markets 30 or more miles distant.

Of 53 men who formerly used markets 5 to 9 miles distant—
7 now use markets 5 to 9 miles distant.
7 now use markets 10 to 14 miles distant.
7 now use markets 15 to 19 miles distant.
7 now use markets 20 to 24 miles distant.
9 now use markets 25 to 29 miles distant.
16 now use markets 30 or more miles distant.

Part III Next Week

How the Electric System Works



Article II

A Short Series of Articles Wherein Is Given the Fundamentals Underlying the Operation of the Modern Electric System as Applied to Automotive Apparatus

By A. H. PACKER
Instructor, Amon Engineering Institute.

MY flivver was hitting on three, as flivvers are in the habit of doing when I hit the little western town, where Bill Fixit held forth as the one and only town electrician. In fact Bill will admit, when hard pressed that he really knows more than most folks about electrical problems, and the only reason he doesn't dig out for New York and make a name for himself, is that his town would be unable to navigate without him.

The surprising thing is that he really is able to get away with most jobs that come to him, and seems to understand the "juice" in his own peculiar way.

While Bill was tinkering around my car, he broke forth on his favorite topic of conversation, and told me of a customer that had been in, also with a flivver, and wanted to have Bill put in two new bulbs in both headlights. It seemed that in hitting it up both lights had suddenly gone out and while the customer had expressed surprise at the coincidence, he did not know but what both bulbs really had to be replaced.

Now Bill is an honest old duffer, and explained to the owner that due to the way the lamps were wired, if one lamp burnt out, the other just naturally went out, so that it was probably necessary to replace but one bulb.

This job of Bill's with the Ford lamps, caused me to speculate somewhat as to the way the situation appeared to Bill and his customer. To the one that understood the laws of electrical circuits, the situation was simple, while to the customer, the action of the lamps was quite mysterious.

The mystery, however, always disappears, when the facts are understood, and as the same laws show up again in our generators, starters and ignition work it is highly important to understand the flow of current in circuits. We shall, therefore, first consider the series circuit, and later the parallel circuit.

As a general definition we will say that a series circuit is one in which the current has one path in which to flow. In Fig. 1 where a lamp and a wire resistance are connected to a battery, it will be observed that there is only one path for the current to flow from positive battery out into the circuit and back to the battery, the same current flowing through both the resistance and the lamp when the switch is closed.

In Fig. 2, it will be observed that the current leaves the battery in a similar manner, but when it comes to the junction point in the circuit, marked "A" it splits, part going through the resistance wire and part through the lamp. These portions of the current join again at "B" and return to the battery. This is called a parallel circuit, there being more than one path for the current to travel, in returning to the battery.

To grasp the nature of the action of series and parallel circuits we will figure out by Ohm's law the currents, voltages, etc. in Fig. 1 and Fig. 2, assuming that the lamp and resistance are 3 ohms respectively.

In last week's issue a wiring table was given in which No. 10 wire was shown as approximately 1 ohm per 1000 ft. or 2 ohms for 2000 ft., etc., from which it is evident that resistances in series add up. This is also evident if we consider the action of water flowing through a pipe, for common sense will tell us tnat there is twice as much friction to be overcome in sending water through 20 ft. of pipe as there would be through 10 ft.

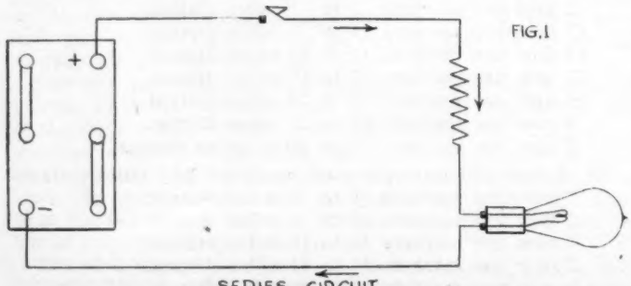
In considering our series circuit, we, therefore, conclude that the 3 ohms resistance in the wire coil added to the 3 ohms resistance in the lamp filament, gives a total of 6 ohms through which battery must cause the current to flow.

Using the formula "Current equals volts divided by ohms" we divide 6 volts by 6 ohms and find the current to be 1 amp.

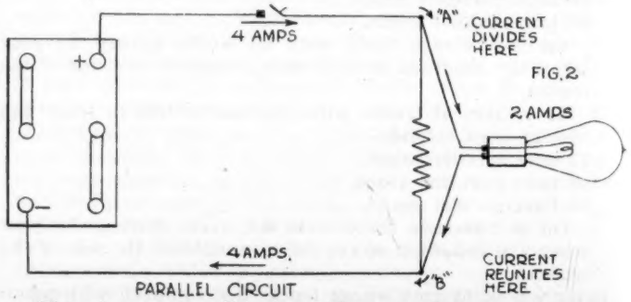
Remembering that voltage is electrical pressure, we can consider not only the initial pressure available at the battery terminals, but also just how that pressure is used up in the circuit. If then we multiply the 3 ohm lamp resistance by the current of 1 amp. that passes through it, we find the answer to be 3 volts, the amount of electrical pressure that was required to force the current through the lamp. As the coil had the same resistance it is evident that 3 volts is also used sending the current through the coil, and from these results we see that the voltage available at the battery is the same as the sum of the voltages used in the different parts of a series circuit. The 3 volt loss across the lamp is called the "IR" drop of the lamp, meaning the current resistance drop or loss in voltage, for as explained in the preceding article, the letter "I" stands for current and the letter "R" stands for resistance.

To simplify our next discussion which will cover the parallel circuit, we have assumed that both the coil and lamp have 3 ohms resistance respectively. If, however, we had considered the coil to have 2 ohms and the lamp to have 4 ohms, the total resistance would have been the same, and the current would still have been 1 amp. In figuring the IR drop however, the coil voltage would now be 2 volts and the lamp voltage 4 from which we observe that in a series circuit the voltage losses are proportional to the resistances through which the current flows.

Summarizing the above characteristics of the series circuit, we conclude that, (1) the current is the same in all parts. (2) Voltage in the parts adds up to the total voltage. (3) Voltage drop, or "IR"



The light in series with the dimmer is a simple series circuit, because all current passing through one unit must pass through another



This shows a parallel circuit, because the two units are side by side and the current in passing through one does not have to pass through the other

loss in any part is proportional to the resistance of that part.

From previous discussions it may not be clear that the first of the above statements is true, so we will illustrate this by the sketch in Fig. 3, where a driving pulley is shown transmitting power by means of a belt to two other pulleys. If we assume that the belt is incompressible and does not stretch or break, it is evident that its speed is the same at all parts of the belt; this corresponding to the incompressible current which must be the same in all parts of the circuit.

Question. In Fig. 1, if the switch is opened, stopping the current at the switch, can it keep on flowing in any other part of the circuit?

Answer. In Fig. 3, if we should suddenly grab the upper part of the belt so as to stop it instantly, could the lower part keep on going? The answer is obviously, "No" and this is also the answer to our question.

Another fact which is illustrated by Fig. 3, is that the voltage in the parts of a circuit adds up to the total voltage for here one driven pulley needs a 2 lb. pull and the other needs 4 lb. so that the driving pulley must supply a 6 lb. pull to the belt, and as voltage is just electrical "push," the similarity is evident.

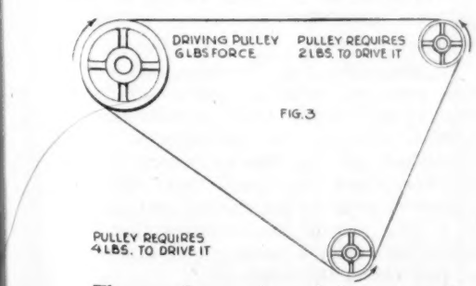
In Fig. 2, we will consider that the switch and wires leading out to the junction points "A" and "B" are comparatively large, and their resistance, therefore, negligible, so that the full force or voltage of the battery is exerted to send current through both the coil and the lamp filament. Using Ohm's law for each circuit we find that dividing 6 volts by 3 ohms gives 2 amp. as the current in each branch of this parallel circuit. If then 2 amp. flows through the coil from "A" to "B" and 2 amp. also flows through the lamp from "A" to "B," there must be 4 amp. coming from the battery through the switch, to the junction point "A" and when this divided current reunites at "B" it again forms a current of 4 amp. returning to the battery.

Problem

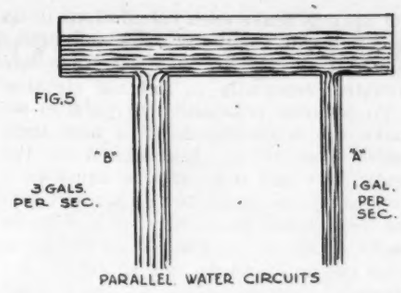
If a 6 volt battery is sending out a current of 4 amp., what must the circuit resistance be?

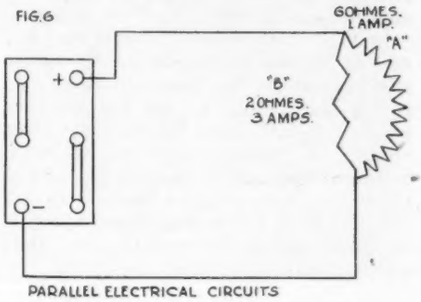
Solution

Using Ohm's law again, we divide the voltage by the current and find that 6 divided by 4 is 1½ ohms. Now this result may at first seem startling for we



The analogy of a belt wrapped around several pulleys to show how the belt stopping in any one position would necessarily cause all pulleys to stop





Parallel water columns flowing through a pipe compared to parallel electrical circuits

began with two 3 ohm resistances, and when putting them in the parallel circuit found their total effect was only 1½ ohms, or half of one of them.

The fact that the optimist sees the doughnut, while the pessimist sees the hole, is well known. In considering the flow of water through a pipe, we only talked about the friction of the sides, and forgot to give credit to the hole through which the water was allowed to flow.

So it is in the case of wires, for while we consider that the wire offers some resistance to the flow of current, it may also be considered as a conductor, allowing a passage of current, so that in Fig. 2, instead of having only one chance for the current to get from "A" to "B" we have two paths so that the obstruction or opposition to current flow is one half. The following conclusion may, therefore, be drawn, that the resistance of two equal resistances in parallel, is equal to half of one of them. In similar manner we conclude that three equal resistance is equal to 1/3 of one of them, and the same rule holds for any number of resistances.

Summarizing the above characteristics of the parallel circuit, we conclude that, (1) The voltage is the same in all parts. (2) Current in the parts adds up to the total current.

The first conclusion means that we have one voltage across "A" and "B" regardless as to whether we consider these points the terminals of the coil or the lamp, while the second one refers to the two circuits with 2 amps. each adding to 4 amps. in the main circuit.

In our practical work on the motor car, we often have to consider both the series and parallel principles in the same problem. In Fig. 4 such a circuit is indicated, where the current from positive battery will flow through the resistance coil from "B" to "A" when the two way switch is in the up position, but will flow from "C" to "A" through the straight wire (having practically no resistance) when the two way switch is in the down position.

At "A" the current divides and part goes through the lamp "L" and part goes through the lamp "R," to ground, or the frame of the car, through which it returns to the battery, which is also grounded or connected to the frame. It, therefore, appears that we have a series circuit from the battery to "A" and a parallel or divided circuit from "A" through the two lamps to the frame of the car. The symbol shown at the end of the wire leading from negative battery is universally used to indicate ground, or connection to frame.

The coil from "A" to "B" is to be used as a dimming resistance and it is desired to have the lamps operate at just half voltage in the dim position. Each lamp if connected by itself directly to a 6 volt battery would draw 2.5 amps. Question? What resistance is needed in the dimming coil?

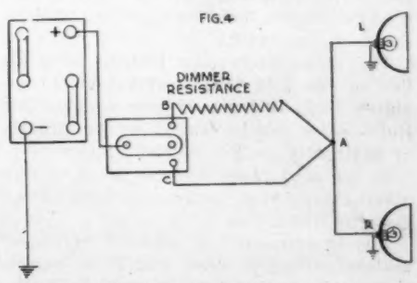
To solve this question we must first figure the resistance of one lamp, which by dividing 2.5 into 6 volts is found to be 2.4 ohms. Then as the two lamps are in parallel, we find by our rule for parallel circuits, that their combined effect is the same as half of one of them or 1.2 ohms as the circuit resistance through both lamps from "A" to the ground.

This effective resistance of the two lamps is in series with the dimming resistance, and from our rules of series circuits, we know that the loss of voltage in a series circuit is proportional to the resistance.

To lose 3 volts in the resistance, and have three volts left for the lamps, we must then have a resistance, equal to the effective lamp resistance, so that 1.2 ohms would be correct for the dimming resistance.

In considering these parallel circuits, we have assumed that both paths for the current were of the same resistance. We will now consider Fig. 5 and 6 in which parallel water circuits are compared to parallel electrical circuits. In Fig. 5, assuming the pipe "B" allows 3 gal. of water per second to flow and that pipe "A" allows 1 gal. per second to flow, it is quite evident that 4 gal. per second flow from the tank.

Now "B" has some resistance of friction and "A" being smaller has more resistance, yet we know that "A" helps the other pipe carry the water out of the



A combination circuit comprising a series circuit and a parallel circuit

tank. It is evident, therefore, that if two pipes carry more water than either one, their combined effect is such that we would say their resistance in parallel must be less than either one.

Considering the electrical circuits in Fig. 6, we find that circuit "B" carries 3 amps., and by Ohm's law must then have a resistance of 2 ohms, as resistance and current must multiply together to equal the voltage acting in the circuit. Similarly circuit "A" if it carries 1 amp., must have a resistance of 6 ohms.

Adding these currents we find that 4 amps. flows from the battery, so that the total effective resistance of the whole circuit is 6 volts divided by 4 amps. or 1½ ohms, so we have put 2 ohms in parallel with 6 ohms and the answer is 1½ ohms.

Now this combination of 2 and 6 to equal 1½ is certainly not addition, nor yet multiplication, so we will consider its real nature, and how to figure resistances in parallel, for while you do not have to make such calculations to do repair work, the knowledge sometimes makes it possible to understand peculiar troubles, especially in lighting circuits.

To combine resistances in parallel we make the acquaintance of a new term called conductivity, represented by the letter "K" and it is always equal to 1 divided by the resistance. This new factor represents the ability of a wire to carry a current, instead of its ability to limit the flow, and we can, therefore, use straight addition when we have conductivities in parallel.

In Fig. 6, the conductivity of "B" is 1 divided by the resistance or ½ and in similar manner the conductivity of "A is 1/6 and adding ½ and 1/6 we have 4/6 or 2/3 as the total conductivity of the circuit. At this point we do not want to forget that 2/3 is conductivity and to get it into resistance we divide 1 by 2/3 and find it is 3/2 or 1½ ohms, which is the same answer we had the first time we figured the problem.

PROBLEMS FOR THE STUDENT

The following problems are given for those who wish to use the explanations given in these articles, and in order that they may be checked, the answers will be given in next week's article.

Problem 1

In Fig. 1, the lamp has a resistance of 8 ohms and the coil has a resistance of 4 ohms.

What will the current be, and what will be the lamp voltage?

Problem 2

In Fig. 2, the lamp has a resistance of 8 ohms and the coil also has 8 ohms resistance. How much current flows from the battery? What is the effective parallel resistance of the lamp and coil?

Problem 3

In Fig. 4, the lamps have each 2 ohms resistance and the dimming coil is 5 ohms. How much current flows in the circuit and what is the lamp voltage?

Article III next week

This Dealer In a Small Town Credits His Service Station With 75 Per Cent of His Sales

IF the automotive dealers in the smaller towns could be educated to the fact that the service station has as much to do with the selling of automobiles as the sales department, they would not have to worry about a period of depression such as was experienced in the past six months.

That the service station plays a far more important role in the conduct of the business as a whole than most of the small town dealers realize, is clearly evidenced by the conditions which have existed in the southeast the past few months. It is a noticeable fact that those dealers in the territory who operate well equipped service stations, who look upon service as an important part of their business and not merely a necessary evil, represent the 25 per cent of the small town dealers who have made real money the past six months. They have let the other 75 per cent do the worrying while they have been doing the business.

B. T. Dorris, owner of the Decatur Buick Co., of Decatur, Ga., is a small town dealer who can be cataloged among the 25 per cent, and pretty close to the top, for Dorris has been selling Buicks the past six months.

The most interesting feature of it all lies in the fact that Dorris himself declares that at least 75 per cent of his Buick sales can be traced, either directly or indirectly, to his service station.

In the first place, then, a word or two about the service station operated by the Decatur Buick Co.

An investment of several thousand dollars is represented and it is doubtless one of the best equipped of the small town service stations to be found anywhere in the southeast. There is a lathe, welding outfit, drill presses, chain hoists, battery charging outfits, and virtually all of the modern conveniences. It is not, of course, a large station—it does not need to be in a town the size of Decatur—but it is thoroughly enough equipped to handle any sort of service the Buick owner may call for, and handle it promptly and efficiently.

NO REDUCTION IN HELP NECESSARY IN LAST TWO YEARS

Ample evidence that this business has suffered very little as a result of the recent period of depression is indicated by the fact that the same seven mechanics have been employed in this station for the past two years. These are expert mechanics in the particular work they are called upon to do and they are well paid. This company has not found it necessary to reduce wages or curtail working hours, but it has enjoyed enough business to keep seven mechanics steadily at work through the entire period. Inasmuch as the average small town shop seldom employs more than two or three mechanics at the most, this is indeed an unusual record.

Now as regards the close alliance between the service station and the sales department of the Decatur Buick Co., at least 75 per cent of the Buick sales Dorris has made the past six months have been to prospects secured through information furnished him by other Buick owners in his territory. In other words, it seems to be a case of "asking the man who owns one."

Right here is precisely where the service station comes in for its full share of the credit. As a matter of truth Dorris himself considers his service as the keynote of the whole proposition. Here is the reason:

Every Buick owner in the three counties covered on retail sales by the Decatur Buick Co., is a satisfied owner. He is satisfied because the service station operated by this company is so well equipped and so well manned that he seldom has trouble with his car. Naturally a satisfied owner is a booster, and a booster is a better advertisement for the Decatur Buick Co., so Dorris has learned, than a page of space every week in the local paper and a thousand personal letters to the names on his mailing list.

But Dorris does not let the matter rest there by any means. He keeps continually in touch with every Buick owner in his territory, and every time he gets a chance he has a few moments' chat with a Buick owner. Being a satisfied owner and a booster for Dorris and his business, these little conversations frequently enable Dorris to obtain the names of one or two other prospects, his friend, Mr. Buick owner, telling him about Mr. So-and-So who might possibly be interested in the purchase of a car. Once he has obtained the name and address of the prospect it is up to Dorris or one of his salesmen to work on that prospect.

Of the sales this company has made the past six months Dorris estimates that 75 per cent of them at least can be traced directly to information thus furnished him by Buick owners in his territory, and therefore they can be traced directly to the service station, for it is this end of the business that has made the owner a booster with a personal interest in the business.

It is interesting to note in passing that this company carries $5,000 worth of parts at all times, which is a considerably larger stock than most small town dealers can boast.

The Gas Station as a Business Booster

THERE is much optimism on the part of garagemen in regard to the value of the gasoline filling station. Many are convinced that the sale of gasoline and oil brings accessory sales and even car sales on the theory that while cars are stopping for gas, drivers will make purchases of other things in the accessory line if the goods are displayed so that they will attract attention.

Very often new buildings are put up with the express purpose of taking advantage of this idea, the filling station being given the position of greatest advantage either on a prominent corner or in a drive-in court in front or at the side of the building.

These stations sacrifice a large amount of the most valuable floor space in the building, running from a minimum of 600 sq. ft. for a corner station to as much as 2000 sq. ft. for some of the more elaborate ones with two or three pumps.

We often wonder if these men really know a profit when they see one. Are they not misled by the fuss and confusion of busy days and a cash register bursting full of money, when after the gas is paid for, only about 8 per cent of which remains to pay interest on investment, rent, free air, sales cost, labor, etc.

We often wonder also if any of them keep a record of the chance accessory sales they make to gas customers, and if with the same energy expended on local advertising either by mail, circular, or newspaper there would be many times the business done. It takes a great deal of effort to sell a thousand gallons of gas which only nets a possible $10 or $15 after all the expenses are paid.

Of course, in some of the favored localities where there is no keen competition with the big oil companies a large profit can be made. We have in mind a locality where all the garages are charging 28 cents with the nearest

The center office of Philadelphia filling station around which are grouped more than a dozen pumps

25 cent Standard Oil Co.'s station only seven miles away. Here, however, car owners only buy when it is absolutely necessary and in this mental attitude will not purchase many accessories. They feel that they are being stung on gasoline, so why wouldn't they be on everything else? Gasoline filling stations would not bring such men accessory trade, they would more probably drive it away.

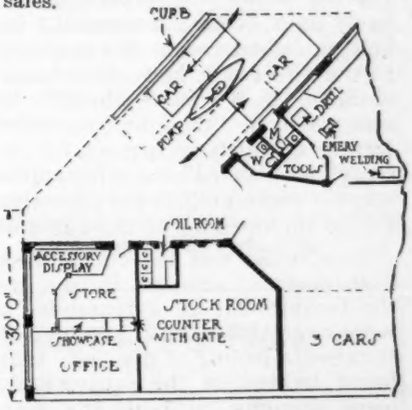
After making quite extensive inquiries the writer has failed to find a motorist who ever bought an accessory while stopping for gas. Few of them even know if accessories are sold where they habitually buy gas and it is the prevailing opinion that if one stops to buy gasoline he buys it and gets out of the way so that someone else can get to the pump.

When the gasoline has been obtained he must move his car and it is only one chance in a hundred that he will stop again to investigate accessories. While getting and paying for his gas he is too busy to examine an accessory display.

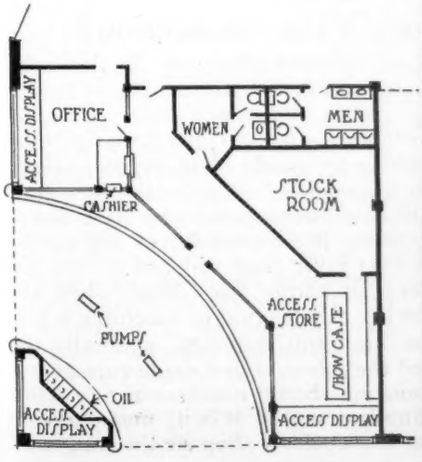
If gasoline is kept merely as an accommodation inside especially where there is a good aisle between an entrance and an exit, this would be an ideal way of bringing in strangers. After looking the situation all over we believe there is slight benefit to accessory sales through the sale of gasoline. Gasoline will sell itself if the pump is displayed and bought with discretion. Our objections are to making the gasoline station the come-on to accessory and car sales rooms with the prize location awarded to it for its service in bringing in customers.

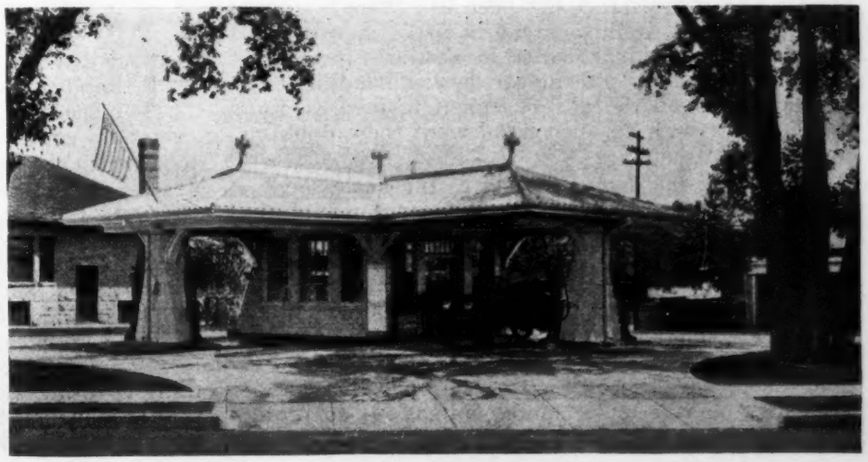
Money can be made selling gasoline but gasoline and accessories do not mix very well if one man is handling them both. Gasoline customers will not wait and if the salesman is busy with an accessory customer he loses the gas sale. If he goes to sell the gas customer the accessory customer is peeved.

With the above facts in mind it would be best to keep a man with no other duties than gasoline and oil sales yet this procedure still further divorces the two departments as a clever accessory salesman can make suggestions to the gas customers resulting in accessory sales.



The plans below and to the right give up prominent corners to the gasoline station for the purpose of boosting accessory sales. Maybe they will, but we doubt if the benefit will be in proportion to the value of the space. The photograph shows how a gosilne filling station can be made a thing of beauty and a credit to the neighborhood





EDITORIAL

Clean Competition

FAIR and square dealings with the manufacturer and with your fellow dealers are as much a part of good business as keeping a set of books and developing intensive salesmanship to sell the cars you handle. This is a day when competition in the automotive industry is perhaps keener than it has been for years but there is a marked difference between clean competition and cut-throat rivalry where a dealer is out to get the best of his neighbor regardless of the way he goes about it. When a dealer resorts to practices that are decidedly open to question there is no place for him in the industry and, fortunately, the industry, quick of perception, will soon force him to seek other lines of activity as a vocation.

Some dealers, perhaps, act on the impulse of the moment in their efforts to get business, without duly reflecting on the effect of their acts. An incident in a western city is a case in point. The dealers there had joined in a movement to stage a show, the purpose being not only to stimulate their own business but to supply a tonic to general conditions. After having gone to great expense and expended much time and energy on their arrangements they were greeted on the day preceding the show with an entirely unexpected and unusual situation. A city dealer had published as an advertisement an announcement to the effect that he had on hand several carloads of automobiles of a make which he had formerly handled and which he "thought," according to his statement, were very much overpriced, f. o. b. that city. Accordingly, he "slashed" the price approximately $700. This was the message that the advertisement carried on the eve of the opening of the automobile show.

Now, what was the effect of such a step? In the first place it aroused in the minds of the public the feeling that all automobiles as sold in that city were overpriced and that a general "slash" was due. It raised a feeling of distrust—that the public was not being treated on the square and that undue profits were accruing to both the manufacturer and the dealer. Sales resistance has been bad enough without a dealer going to this extent to make it worse. It hurt every individual dealer in that city because it reflected upon him and the car he was handling. The public who read the advertisement instead of going to the show with an open mind went there doubting, uncertain, suspecting.

Outside of the damage it did to the dealer body it did inestimable injury to the manufacturer of that particular car and so to the industry. Whether the dealer's franchise had been taken away by the manufacturer and the advertisement was in the nature of pique on the part of the dealer or whether it had been sold voluntarily by the dealer because of the honesty of his convictions, is of little moment. So long as the dealer had on hand any cars under this franchise he was under moral obligations to protect the manufacturer.

This dealer's action savored a good deal of the old methods of selling merchandise. In these days and times constructive rather than destructive policies are necessary in all lines of industry. Have the industry as an industry at heart. If you believe in the automotive industry, and you do or you would not be a part of it, boost it; don't run it down; don't cast suspicion on it. Build up, don't tear down.

Maintaining a Contact Point

JUST because you have sold a man an automobile, truck or tractor is no assurance that the next time he buys an automotive vehicle you will be the one who makes the sale. Too many automotive establishments get into the habit of forgetting the customer once they have made a sale. One of the things that is of the utmost importance in so far as the dealer's business is concerned is the maintaining of personal contact with his customers. This may be done directly by the executive, the salesmen, or the service department. It does not matter just how this contact is maintained, just so long as the customer is made to feel that the house behind the car he bought is interested in his welfare.

In the smaller towns it is easier for the dealer himself to maintain the personal contact, but in the larger centers the job becomes relatively more difficult. And, it is in the larger towns where we find repeat sales not as forthcoming as they might be. This probably is due to the fact that the dealer has to depend upon letters, newspapers, etc., to reach his customers, a procedure which, obviously, is not comparable with personal talks over the telephone, or talking to a man in his office.

Even if the dealer leaves it to the service department to establish the right point of contact with the customer, or the sales department, the customer will be far more impressed with the stability of the dealer's business if the dealer goes to the trouble of personally looking after the wants of his customers.

Who Does Your Inspection?

HAVE you ever realized that one of the most important jobs in your service station is that of inspection? What assurance have you that every job your mechanics turn out, particularly those jobs which are done on the inside of an engine, axle or gearset, have been done right? Maybe the mechanic forgot to put on lock washers, cotters or wire and if something lets go when the owner drives the car he naturally assumes that your shop did not do the job right. Some successful shops have established the custom of not allowing a mechanic to assemble a job, replace a crankcase, etc., until someone, generally the foreman, has looked the job over and made sure everything is right. Someone should check over any work that is done by another man. It will mean money made and saved in the dealer's shop in the long run.

Detroit Names Committee to Formulate Plan for Used Cars

Dealers' Association Also Appoints Representatives to Assist in Formation of State Organization

DETROIT, April 14—Guy O. Simons, president of the Simons Sales Co., will head the Detroit Automobile Dealers' Association for the next year, succeeding L. Zeckendorf. Simons was elected at the annual meeting held at the Detroit Athletic Club Monday night, when Manager H. H. Shuart presented his report of the results of the recent show. From the standpoint of attendance and sales, Shuart presented figures to show the event was the most successful in the history of the local association. The report of the treasurer showing the organization's finances to be in splendid condition was gratifying.

In addition to Simons, officers elected were as follows: Harry R. Graham of Owen & Graham, G. M. C. truck distributors, vice-president; R. H. Williams of Williams & Hastings, Inc., Hupp distributors, secretary, and Walter J. Judd of the Miller Judd Co., Liberty distributors, treasurer. Charles Hathaway of the Lafayette Distributing Co. was elected a director.

Will Concentrate on Used Car Evils

A committee composed of A. L. McCormick, manager of Paige Sales & Service Co.; Howard Bauer, Nash Distributing Co.; S. E. Comstock, manager of Thos. J. Doyle Co., Dodge distributors; Chas. E. Baker, president Baker-Fisk-Hugill Co., Dort distributors, and Mr. Williams was named to formulate a plan for proper handling of trade-in sales and the marketing of used cars. The used car situation in the last few months has become the most important before the association and concerted effort to eliminate the evils attended upon traffic in used cars is contemplated.

In the future, association meetings will be held every 30 days and the penalty for absence from three successive meetings will be expulsion.

The local association will take the lead in the efforts looking to the information of the state association to affiliate with the N. A. D. A. at a meeting which will be held at the Statler Hotel April 19, at which plans for the state organization will be formulated. Walter J. Bemb of Bemb Robinson Co., and Mr. Graham will represent the local association at the conference, which will be attended by representatives from all of the larger towns in Michigan. Much missionary work has been done along the state association line by Simons. Shuart and Harry G. Moock, manager of the N. A. D. A. Up state dealers are enthusiastic over the plan and it is expected the actual work of organizing the association will follow quickly upon the heels of the conference next Tuesday.

St. Louis, April 15—The final arrangements for the organization of the Michigan State Automotive Dealers' Association to be affiliated with the N. A. D. A. will be completed at a conference to be attended by two delegates from each local association in the state of Michigan and to be held at the Statler Hotel, Detroit, on April 19 under the auspices of the National Automobile Dealers' Association and the personal direction of Harry G. Moock, general manager, and P. F. Drury, assistant manager.

The following delegates have already been appointed by some of the associations which are to be represented: George L. Simmons and Dallas W. Marshall, Flint; Alex Levinson and J. J. Tompkins, Saginaw; Dwight Robson and Chas. Gower, Lansing; M. A. Campbell and Arthur Zazerelere, Dowagiac; R. E. Becker and W. L. Peiter, Grand Rapids; B. F. Wells, Benton Harbor and St. Joseph; Guy Butler and Gilbert Loomis, Jackson; Charles A. Witt and Henry L. Gwatkin, Muskegon; Chas. L. Meade and Jas. Woodward, Battle Creek.

Other associations which will be represented are—Port Huron, Pontiac, Kalamazoo, Detroit and Mt. Pleasant.

WHITE CO. CUTS FORCE

Cleveland, April 15—The White Co. will reduce its working force May 1 from 5,000 to 3,000 employees. Orders are being received at the plant in excess of the production but the curtailment in the working force is the result of the policy of the company. In keeping up maximum production for months when other similar corporations were either closed or were operating on a greatly reduced schedule all last winter the White company kept its full force of night and day workers going at maximum capacity. There was a slight reduction in hours worked each week, on Jan. 1 and later the night staff was combined with the day. That was but a few weeks ago. As a result the company accumulated a large reserve stock of trucks. It is now drawing on this, hence the curtailment in production.

Anti-Dumping Bill to Pass Must Cover Reimportations

Senator Smoot Would Embrace All Phases of Foreign Competition in Measure

WASHINGTON, April 16—No anti-dumping bill will be allowed to pass in the Senate without a specific provision covering reimportation of army trucks and other surplus war supplies sold abroad.

This statement was made today by Senator Smoot in an interview given the correspondent of MOTOR AGE. The anti-dumping measure which Representative Young of North Dakota introduced in the House Monday did not carry this proviso.

Senator Smoot feels that the anti-dumping measure is for the protection of domestic markets from foreign competition and that it must embrace all phases of the problem. He is prepared to draft an amendment to the Young bill if it passes the House without the provision essential to the protection of American motor vehicle manufacturers and dealers.

Representative Young told MOTOR AGE that his bill was designed to cover every form of dumping but admitted that the question of reimportation had not been considered specifically. When it was pointed out to him that a heavy burden was placed on the American automotive industry by the reimportation of American made vehicles, duty free, and their sale here at prices below production cost, he indicated that this condition could be corrected by amendments offered from the floor when the bill is before the House.

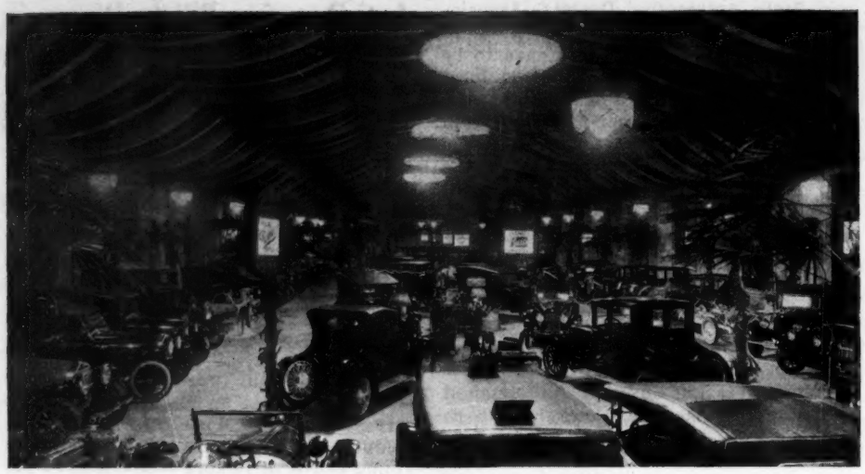
It is expected that dealers in California and other states who have felt the effects of the sale here of surplus war supplies by foreign agencies will appeal to their congressman for action.

A "Bull Ring" to Sell Used Cars at Show in Chicago

CHICAGO, April 14—A "bull ring" for used cars is contemplated by the Chicago Automobile Trade Association in connection with the fourth annual used automobile show which will be held in the Coliseum the week beginning May 7. Under this plan, which is receiving the consideration of the show committee composed of James Levy, R. C. Cook, C. E. Gambill and H. P. Branstetter, cars on certain prescribed nights will be sold in the "ring," which will be staged in the Coliseum Annex, at specified prices.

There will be a $200 night, a $400 night, a $600 night, an $800 night and a $1,000 night and on these respective nights any and all cars put into the "ring" by the exhibitors will be sold at the price named for that night. They will be disposed of in as-is condition and receipts will be signed by the purchasers with that understanding. A policy of "Pay-your-money-and-take-your-choice" will prevail.

With each exhibitor given the privilege of placing one car in the "ring" each night it is expected that there will be forty cars from which the customer can make his selection. The selling will not be done by the exhibitor's salesmen but by a man in charge of the "ring." Delivery would be made immediately after closing time each night, the purchaser not knowing from whom he has bought his choice. Payment will be made by certified check made payable to the trade association or by cash at a cashier's desk installed for the purpose.



Seattle Dealers Staged an Attractive Show

The dealers at the Seattle show, in planning the exhibits, set out to give plenty of room to the individual displays. One of the features of the decorations was the concealing of the walls with Persian and Turkish rugs, each rug framed in a suitable setting with an inscription recounting something of its history

Trade Association Launched by Washington State at Show Time

Dealers Have Separate Organization But Efforts at Consolidation Will Be Made

SEATTLE, April 14—There is no room for the unscrupulous man in the automotive trades. The higher the plane upon which the automotive business can be placed the greater will be the volume of returns and the sooner will healthy conditions return. The honest and square-dealing tradesmen must organize to weed out the men who are bringing great injury upon the business as a whole.

Cooperative efforts in general merchandising plans and to combat freak and unjust legislation are absolutely essential, especially in this period.

Business is showing general improvement with every indication that the summer months will see a continuance of this improvement in very satisfactory proportions.

The above were the outstanding features of the first annual state convention of members of the automotive trades of the state of Washington, held here during the Seattle automobile show. At the convention the new Washington Automotive Trades Association was formally launched and plans were made for thoroughly organizing the automotive trades of the state. Several hundred delegates from all parts of the state were in attendance at the convention.

Several members of the King County Automotive Trades Association described to the delegates the great success that has been met in California by a statewide organization of automotive tradesmen and the healthier atmosphere that has been created as a result of the work of the California body. In order to show how the association may function to eliminate the unscrupulous men from the business, a case was cited of a garage man in Stockton who had made a charge for installing new pistons in an automobile that had been given him for general repair. A mechanic employed by the garage at the time of the repair job and who later left his position subsequently reported to the motorist that no new pistons had been installed. The case was submitted to the association, which investigated the circumstances and found that the garage man was guilty of deliberately defrauding the motorist. An appropriation of $500 was made by the association for prosecuting the garage man who was found guilty and sentenced.

At present only branches of the automotive trades outside of the dealers are members of the Washington trades association. The dealers have a separate association but attempts will be made shortly to bring the two organizations into one body. It is contended by the officers of the newly formed association that the industry would be more greatly benefitted if all branches, including the dealers, were to work together through the same channels.

COLE STORAGE BATTERY EXPANDS

Chicago, April 14—C. C. Carpenter has resigned as chief chemist of the U. S. Light & Heat Corp. to become vice-president of the Cole Storage Battery Co., Chicago, and W. R. Dudley has severed his connection as Chicago branch manager for the corporation to become general sales manager of the battery company.

The company was organized in 1917 for the manufacture of starting and lighting batteries. In addition to producing storage batteries it also makes a complete line of vehicle and lighting plant batteries. Under a new sales policy large distributors will be enabled to assemble and sell their own batteries.

Government Auctions 1200 Vehicles in Seven Hours

Most of Automobiles Sold at Camp Jesup, Ga., Are in Poor Condition

ATLANTA, Ga., April 18—Twelve hundred motor vehicles were sold in seven hours at Camp Jesup, Ga., near Atlanta, by a corps of auctioneers representing the United States government, who are making a tour of various army camps throughout the country disposing, in this way, of motor vehicles used by the government during the war. Most of the automobiles sold at Camp Jesup were in rather poor condition, prices paid ranging from less than $100 in a few cases to as high as $1100.

The sale included about 300 motor trucks, all of well known makes, ranging in capacity from ¼ ton to 5 tons. There were about 100 touring cars and roadsters, 800 motorcycles and 500 sidecars.

Buyers were present at the Camp Jesup sales from some of the northern and eastern states, and from all over the south. They represented, in some cases, persons in quest of individual bargains for their own use, but there were also several speculators present and a number of dealers. The latter purchased frequently when the prices were right and, in some instances, the bidding was rather spirited.

Dealers in the Atlanta territory do not believe that the sale will affect their business to any material extent, for many of the purchases were by men outside this section, only a comparatively few of the sales being to local dealers and buyers. The only effect on business that the sale would be likely to have will doubtless be of used cars, and it is not believed that its effect in this regard will be of serious consequence, for so many of the cars sold at Jesup were in very poor condition.

"Automotive News Letter" Issued by Chicago Dealers

Chicago, April 14—The first issue of the "Automotive News Letter," the official organ of the Chicago Automobile Trade Association, as authorized at the last meeting of the retiring board of directors, has just come from the press. It is a breezy, eight-page paper, filled with information of interest to the local trade and will be issued monthly.

"The News Letter" says the official announcement, "will have for its object the promotion of friendly relations, good ethics and sound business methods among its members; developing and protecting the interests of the automotive and allied trades to the benefit of themselves, the government and the general public."

Its scope will include the activities of the association, news of interest to the members and "suitable editorials on topics of the times."

Motor Car Indispensable in American Life—Harding

President of United States in First Address to Congress Recognizes Its Essentiality

"The highways are not only feeders to the railroads and afford relief from their local burdens; they are actually lines of motor traffic in interstate commerce They are the smaller arteries of the larger portion of our commerce, and **the motor car has become an indispensable instrument in our political, social and industrial life.**"—President Harding.

WASHINGTON, April 14—Essentiality of the motor vehicle has been recognized by the President of the United States.

President Harding, in his first address to Congress, proclaimed that the motor car is indispensable in every phase of American life. After discussing the problems of the railroads and the need for reduced rates to increase traffic, he took up the question of highway transportation, expressing complete accord with the arguments presented to him at a conference Friday with representatives of the National Automobile Chamber of Commerce. On this subject he said:

"Transportation over the highways is little less important, but the problems relate to construction and development, and deserve your most earnest attention, because we are laying a foundation for a long time to come, and the creation is very difficult to visualize in its great possibilities.

New Highway Period

"There is begun a new era in highway construction, the outlay for which runs far into hundreds of millions of dollars. Bond issues by road districts, counties, and states mount to enormous figures, and the country is facing such an outlay that it is vital that every effort shall be directed against wasted effort and unjustifiable expenditure.

"The Federal Government can place no inhibition on the expenditure in the several states; but, since Congress has embarked upon a policy of assisting the states in highway improvement, wisely, I believe, it can assert a wholly becoming influence in shaping policy.

"With the principle of Federal participation acceptably established, probably never to be abandoned, it is important to exert Federal influence in developing comprehensive plans looking to the promotion of commerce, and apply our expenditures in the surest way to guarantee a public return for money expended.

"Large Federal outlay demands a Federal voice in the program of expenditure. Congress can not justify a mere gift from the Federal purse to the several states, to be prorated among counties for road betterment. Such a course will invite abuses which it were better to guard against in the beginning.

"The laws governing Federal aid should be amended and strengthened. The Federal agency of administration should be elevated to the importance and vested with authority comparable to the work before it. And Congress ought to prescribe conditions to Federal appropriations which will necessitate a consistent program of uniformity which will justify the Federal outlay.

"I know of nothing more shocking than the millions of public funds wasted in improved highways, wasted because there is no policy of maintenance. The neglect is not universal, but is very near it. There is nothing the Congress can do more effectively to end this shocking waste than condition all Federal aid on provisions for maintenance. Highways, no matter how generous the outlay for construction, can not be maintained without patrol and constant repair. Such conditions insisted upon in the grant of Federal aid will safeguard the public which pays and guard the Federal Government against political abuses, which tend to defeat the very purposes for which we authorize Federal expenditure."

Fords in Wisconsin in 1920 More Than Half All Cars Used

Milwaukee, Wis., April 18—An analysis of motor car registrations made in Wisconsin in 1920 shows that out of 275,493 passenger cars licensed in the period, 139,724, or more than 50 per cent, were Fords. The most popular makes thereafter were: Overland, 19,604; Buick, 19,502; Chevrolet, 14,094; Dodge, 9,506; Maxwell, 9,505; Studebaker, 8,297; Oakland, 6,322; Nash, 4,848; Reo, 4,242; Mitchell, 2,581; Olds, 2,506; Hudson, 2,393; Dort, 2,194; Cadillac, 1,881; Paige, 1,771; Chalmers, 1,551; Briscoe, 1,420; Saxon, 1,432; Hupmobile, 1,263; Kissel, 1,235; Case, 1,193. Other makes fall below the 1000-mark. With 9.5 persons to every car registered, Wisconsin ranks fifteenth among the states of the Union in "motor density." Compared with 1919, there was a gain of 62,262 cars, or 29.2 per cent in 1920.

Sales Record for Southern California Set Last Month

Recapitulation of Registration Shows Increase in Truck and Car Business

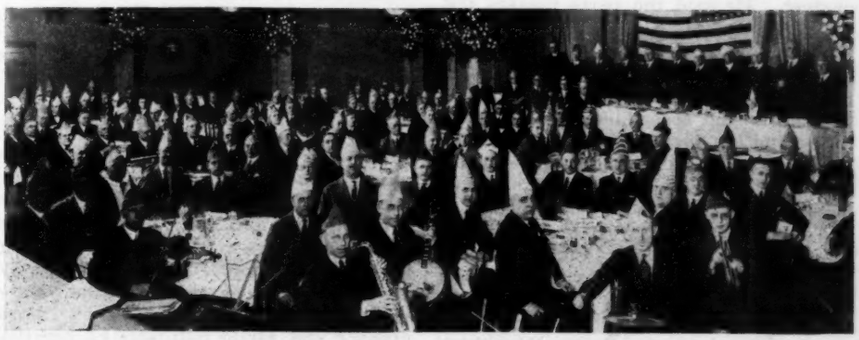
LOS ANGELES, April 14—Indications are that the month of March established a new record for motor car and truck sales in Southern California. A recapitulation of car and truck registrations shows 6259 cars and 747 trucks were registered during the month. This applies to new vehicles only and does not include motorcycles and tractors. The report means that more new cars and trucks were sold last month than ever known before.

Ford deliveries came through with a bang during March and of the totals 2820 cars and 407 trucks were of this one make. There are ten counties in Southern California and there was a liberal increase in sales in all counties with the biggest addition in Los Angeles city and county. From this city alone 4010 new cars were registered, The next big sensation of the registrations is the number of Studebakers sold. The figures credit Studebaker with 345 registrations and this car led everything in its price class. Next to the Ford the Chevrolet was the biggest seller.

Motor Trucks Increase Appreciably

Truck registrations were particularly heavy. The registrations show that next to the Ford and Dodge came the Mack, which distanced all of the exclusively heavy-duty trucks easily. The sales of Macks show truck business outside of Los Angeles was exceptionally brisk as 28 of a total of 41 were registered from elsewhere than this city.

Dealers assign the increasing number of motor vehicle sales to a return of confidence upon the part of the public, heavy advertising and consistently hard work. There has come an awakening to the fact that business has to be dug up and those who are driving the hardest are the ones who are getting results. To date this month indications are that April will prove even better than March was.



The annual meeting of the Milwaukee Automotive Dealers' Association took the form of a frolic, one of the purposes of the jollification being to welcome home Jesse A. Smith, the new president of the N. A. D. A.

Spirit of Harmony at Meeting to Consider Parts Servicing

Committees Are Appointed to Take Steps Looking Toward Solution of Problem

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them. This too he said in face of the fact that the dealer had made the parts makers their business. The serious problem from the manufacturing standpoint Pulcher said, was in keeping the dealer organization intact and declared that the dealer's only profit in the last six months was from service. He emphasized the fact that the manufacturer lost contact with his customer when that customer was enabled to go to a parts station for new parts rather than to the dealer. Pulcher said prices varied as high as $40 in some instances and urged the need of standardization and printed price lists.

Pulcher told of the trouble in getting dealers and holding them and in citing concrete instances where his company had helped a dealer financially asked if a parts maker would have done that. If an inferior part goes out in a truck Pulcher said unless it comes back to the dealer, the manufacturer knows nothing about it and the truck gets the blame. He said his company was ready to help the small assembler who was unable to maintain a large dealer organization by giving him discounts and in every other way. Pulcher declared his company was ready to cooperate but was unalterably opposed to the stations operated by the parts makers.

Service to Car Owners

In support of the parts station plan Mr. Yeoman recited the history dating from the first station established five years ago which he said was brought about by continued complaints from customers that they could not get service. With reference to the plea for the dealers Yeoman said the dealer's profit on parts is so small as to be of virtually no consideration and cited numerous figures in support of his contention. He insisted the only reason Continental was operating the service station plan was to insure service to users of Continental engines. He said the parts makers felt that the plan was a big asset to the assembler and declared it was their earnest desire to cooperate with the assembler in convincing the consumer of the advantage of the assembled truck thereby increasing the demand. The parts stocks in the stations now operating, Yeoman said, varied in values from $20,000 to $90,000 and he contended that many men had heavy building investments in them in addition. He said it was the unanimous opinion of the parts makers that the truck manufacturers were unable to find dealers who could assure proper service, the inference being that there would be no inclination to recede from the present position.

Otto Armleder, president of the O. Armleder Co., took the parts makers to task for not fulfilling their obligations to the manufacturer and his customer in their attitude on replacements. "We stand behind every unit of our product," said he, "and when you send out an improper product it is your duty to replace it and assume all expenses. It is the great evil of the business. You parts makers must start right. We owe our customers an obligation and you owe the same to us."

Estel Scott, general manager of the General Auto Parts Co., of Kansas City, urged that inasmuch as the average dealer was not financially able to maintain an adequate supply of parts some method must be arrived at for properly caring for service problems through service stations. Emphasizing his point Scott said he carried a $62,000 stock of parts and contended every dealer must be equipped similarly in properly servicing his line. Service he said was the vital problem today and if it is not adequately furnished the business will be killed. Scott made a plea for a systematic campaign of investigation among individual users to get their ideas of the best methods and insisted they would be a unit in demanding the plan that assured servcie no matter by what name designated or by whom maintained.

Moock Backs Up Dealers

Mr. Whipple opposing the present plan said the real question is who is going to conduct the parts servicing business. He asked if it was presumed the men who built up the business were going to turn it over to the parts makers virtually admitting they were incompetent to conduct it. "We want to conduct the business along proper servicing lines and we are asking only cooperation," he said.

Harry G. Moock, manager of the N. A. D. A., made a strong plea for the dealer who he declared was struggling to keep his head above water. In the final analysis he said the dealer is the one to be considered as the point of contact between the manufacturer, the parts maker and the consumer. Educate the dealer and show him where his duty to the manufacturer and customer lies but don't take away his profits and force him out of business, said Moock. He cautioned his audience to take the dealer into its confidence lest it run against a wall of opposition when the time for settlement comes.

R. C. Rognon, president of the Automotive Service Association of New York, said the truck manufacturer had not given consideration to the proper servicing of the motor vehicle. If he had he would now be servicing his product and present conditions would not have arisen he said. Rognon cited cases of many fleet owners now servicing themselves and said others were in contemplation because of the inadequacy of servicing by dealers. He said if central stations were maintained fleet owners could buy more cheaply and would naturally be heartily in favor of the plan. Service must be out on a commercial basis if the industry is to live, said Rognon.

Public's View of Industry Is Shown in Rapid Bond Selling

First Financing in More Than Year Accomplished in Less Than Two Hours

DETROIT, April 15—President Alvan Macauley of the Packard Motor Car Co., in announcing that the issue of $10,000,000 bonds by the company had been subscribed in less than two hours after being offered, declared it was simply proof of public confidence in the automotive industry.

"This is the first financing that has been accomplished by an automobile company in more than a year," said Mr. Macauley, "and its success has exceeded the most optimistic hopes. Many bankers had believed it was not yet possible to float such an issue. It simply proves that investors realize that the industry is sound and that it is passing from the depression of the last few months."

The money received from the note issue will be used as working capital, and will permit a greatly increased production, Mr. Macauley said. Packard had planned an output of about 1,000 single sixes for April and at the beginning of the month employing close to 3,000 men. With ample financial resources product on schedules will be increased rapidly and it is expected the May output will be almost double that of April.

While practically all efforts of the company are being directed at production of the single six, twin sixes are coming through every day in small numbers. Sales demand throughout the country except in three sections which have not yet recovered from the depression, Mr. Macauley said, assures a ready market for Packard cars as fast as they can be turned out at the factory.

A. L. WESTGARD DIES

Oswego, N. Y., April 14—The funeral of A. L. Westgard, who died at San Diego, Cal., on April 3 after an illness dating from last fall, was held here Tuesday. Mr. Westgard was organizer of the Touring Club of America, associated with the A. A. A. in pathfinding work and later connected with the National Highways Association. He took an active part in the compilation of the Blue Book at one time. At the time of his death he was connected with the A. A. A. in a consulting capacity.

DODGE DEALERS NOT RESTRICTED

Detroit, April 14—Denial is made by Dodge Brothers that it has informed all dealers that they must handle the Dodge line exclusively or forfeit their contracts. Recent changes in representation in two or three large cities are responsible for the report. When new dealers are appointed, the company asserts, it is simply because of local conditions and not the result of a general policy.

Four Dealers Stage a Big Little Show

ST. LOUIS, April 18—Here is probably the smallest regular dealer organization automotive show held in this country and is indicative of dealer faith in the industry and an example of the cooperative spirit;

Place—Webster Groves, Mo., 20 miles from St. Louis. Population—9,000.

Exhibitors—Four automobile dealers: Montague Reichardt Motor Co., Weilandy-Reller, Tate Motor Co., and Bopp Bros. C. A. Richardt was chairman.

Admission Fee—None. Attendance—3,500. Length of Show—Two days.

Sales—Seven with five additional after the show and many prospects promising future business.

Expenses—$600, divided among the four dealers.

Securing the town armory for the exhibition, the four dealers decorated it, advertised the show through local newspapers. distributed banners and printed dodgers, enlisted the aid of a home university to furnish the music and secured the services of the Parent-Teacher Association to look after the refreshments.

The four dealers represented five lines—Nash, Oakland, Studebaker, Dodge Brothers and Ford and exhibited them with the Lincoln line from St. Louis—and a $10,000 Packard special body job, sport model, which arrived too late for the St. Louis show and gave the Webster Groves affair an air of some importance.

Twenty-two motor cars were on exhibition with displays by one battery company with a line of accessories and one commercial body company.

The dealers declare that it will be an annual affair from now on. As one stated, it has aroused a friendly feeling among the customers, created a lot of good will for the business and developed many new prospects.

Plants in Cleveland Working On 50 Per Cent Capacity Basis

Demand for Cars Will Increase Schedules Considerably in Coming Months

CLEVELAND, April 14—The Grant Motor Car Co. has given one of the most striking demonstrations in the local field of the progress made in the production end of the automobile industry since the first of the year.

The March program of that company provided for the production of 350 cars, but the demand brought an increase in this schedule so that 450 cars were made and delivered from the factory.

The schedule for April calls for 450 cars, but the volume of orders the first week in April were far in excess of the number received in the same period in March. Predictions are made that the company will exceed its April schedule by from 50 to 75 cars. The company has aimed to exceed its production schedule each month since the first of January.

For the first time in months help wanted ads are appearing in local newspapers over the signature of automobile companies. Manufacturers are advising their former employees to get in touch with them at once, as positions are open.

The Jordan Motor Car Co. has been advertising for the return of its men to their old positions. This company has gradually increased its production each month.

The Chandler Motor Car Co. reports better business in April so far than it had during March. The same is true of The Peerless Motor Car Co., the Templar Motors Corp., the White Co., and the Cleveland Automobile Co. The Merit car, which just recently has been produced in this city, has met with a ready demand, the management reporting that already 500 orders have been received.

On an average, it is estimated that local automobile factories are working on about a 50 per cent of capacity basis, with prospects favorable to a considerable increase in production in the next two or three months.

Senators and Governors at Meeting to Boost Good Roads

Greensboro, N. C., April 18—One of the objects of the annual meeting of the United States Good Roads Association, the Bankhead National Highway Association and the United States Good Roads Show, which will open in this city today and continue until April 23, is to urge upon the present congress the re-enactment of the federal aid bill of $100,000,000 to aid the states in building good roads.

The address of welcome will be made by Governor Cameron Morrison. There will also be addresses by Senator Thomas J. Heflin of Alabama, Governor Lee M. Russell of Mississippi, Senator Lee S. Overman of North Carolina, Governor-elect Thomas W. Hardwick of Georgia, Senator Charles E. Townsend of Michigan, father of the Townsend highway bill; former Secretary of the Navy Josephus Daniels, Senator Claude Swanson of Virginia, and Representatives W. B. Bankhead of Alabama and J. H. Ward of North Carolina.

D'ALENE STAGING RACES

Evansville, Ind., April 18—Wilbur D'Alene, of this city, successful driver in the Indianapolis and Cincinnati races of 1916, will hold free for all automobile races at Hamilton, Ohio, May 30, and Erlanger, Ky., June 11.

Greater Briscoe Production Provided in Reorganization

New President Names Sales Executives Who Will Put Car to Forefront

DETROIT, April 14—With the company on a sound financial basis, C. A. Earl, newly elected president of Briscoe Motors Corp., has perfected the reorganization of the company's personnel and formulated plans for speeding up production in the factory at Jackson. The Tilden and Swift interests of Chicago, which control Briscoe, have issued 100,000 shares of stock at $20 par value for the use of the company as working capital. Rules of the stock exchange and other technicalities necessitate waiting a certain number of days during which time present stockholders are given preference in subscribing to the issue before the money actually can be turned in and the stock taken over by the financial interests in control. A representative of the Chicago financiers said Saturday the interests behind Briscoe had full confidence in the company's product, and with Earl in control had every assurance of a bright future ahead. Ample financial backing is assured the company, he said, to permit of the carrying out of policies and plans formulated by Earl.

Jacoby Director of Sales

As the first step in putting the plant on a quantity production basis, and at the same time perfecting a sales organization that will put the car in the forefront, Earl announced the selection of K. R. Jacoby, former director of purchases for Willys-Overland, as the new director of sales. J. R. Findlater, a veteran at Briscoe, continues as vice-president in charge of Pacific Coast distribution. H. F. Wardwell, who was succeeded as president by Earl, remains as vice-president. Other officers are John Fletcher, treasurer; L. C. Allen, assistant treasurer; L. E. Latta, secretary; E. R. Cowham, assistant general sales manager; D. M. Shaw, advertising manager; Victor Jantsch, chief engineer; J. C. Cunningham, general superintendent; T. W. Tinkham, assistant general superintendent; J. L. Blyth, director of service; W. M. Zerby, traffic manager.

New division managers also have been named by Earl as follows: J. A. Garrity in the western division; F. A. Bixby, northwestern division; H. G. L. Campbell, eastern central division; C. E. Rollins, western central division; J. C. Baggott, eastern division and A. H. Jones, assistant to J. R. Findlater on the Coast. R. M. Chapman who has been associated with Earl several years, is made assistant to the president.

The factory has started on a production of 20 cars a day which will be increased gradually according to Earl, until it is hoped to reach a daily output of 75. This, of course, is contingent upon market conditions and sales requirements.

Charge Atmosphere with Car Appeal at Show in Seattle

Dealers Set Public Talking and Thinking About Automobiles Through Promotional Work

SEATTLE, April 14—The automobile business in the Pacific Northwest will enjoy a healthy season this year.

This is the only conclusion that can be reached following the close of the greatest automobile show ever staged in this section. In point of actual sales made on the show floors, prospects developed and the attendance, the third annual Seattle automobile show, staged under the direction of the Seattle Motor Car Dealers' Association, reached proportions beyond all expectations. Realizing the need for a presentation of the automobile this season in a more vigorous manner than for years past, the dealers' association set Seattle and vicinity to talking and thinking about automobiles and automobile accessories in a way that resulted in substantial rewards to the trade.

Mayor Leads Parade

The Seattle dealers so thoroughly saturated the atmosphere in their sphere of activities with the "appeal of the automobile" that almost at every turn "the appeal" confronted the people. In virtually every display window in the specialty shops and department stores on the leading business streets some form of automotive equipment, principally tires, was displayed.

Led by a venerable Ford of the vintage of 1903, driven by Mayor Hugh Caldwell, a procession of archaic motor cars of various descriptions moved through the main streets to the show rooms on the opening day of the show. Overhead, airplanes were flying about; underneath the wings of the planes were painted in large letters, "Seattle Automobile Show," and down from the cockpits there rained a shower of floral bombs and printed notices heralding the opening of the show. Including appealing vari-colored cardboard signs for display windows, bill board advertising, display advertising in the newspapers paid for by the association and space willingly given over by leading mercantile establishments, and in many other ways the dealers put across their message in a decidedly big way. And big results were gained from the attendance at the show.

The show place extended over practically an entire block, embracing an intervening street which separated two of the largest halls in the city. The street space was covered by a pavilion and the two halls joined.

In decorations, lighting and musical features, an expenditure of $20,000 was made. There were about 170 motor cars displayed.

FAVOR MUNICIPAL GARAGE

Philadelphia, April 14—The bill, now in city council, creating a Bureau of City Motors, which would centralize all city owned motor cars except those in the fire and police bureaus and those used by department heads and placing them for storage and repair in a city owned garage, is finding increasing favor. Frederick P. Gruenberg, director of the Bureau of Municipal Research, is among those declaring in favor of the municipal garage. He believes that it would result in a better system of maintenance than the present scattered method of keeping city owned cars in various places.

Collins Leaves Cadillac For Durant Organization

New York, April 18—R. H. Collins has resigned as president and general manager of the Cadillac Motor Car Co. to associate himself with W. C. Durant in the development of Durant Motors, Inc. He will head the Durant subsidiary company in Michigan which may be known as the Durant-Collins Co. In this capacity he will be in charge of the chief manufacturing activities of Durant motors which will be centralized in the Detroit district. The main factory will be located either in Detroit or Flint. Collins is said to favor locating in the former city.

The addition of Collins to the Durant organization is regarded as a strong acquisition. He will have much to say regarding the development of the Durant line and it is thought probable that in addition to the Durant Four there also will be a Collins car.

Frampton Succeeds Brockman as Head of St. Louis Dealers

St. Louis, April 14—Reynolds C. Frampton, head of the Hudson-Frampton Motor Car Co., was elected president of the St. Louis Automobile Manufacturers' and Dealers' Association to succeed Philip H. Brockman during a meeting held at the Hotel Claridge. Mr. Brockman, who is president of the DeLuxe Automobile Co., Oldsmobile distributors, has served two terms as president of the organization and recently was appointed a member of the St. Louis Police Board.

During the meeting a beautiful silver service was presented to Mr. Brockman by the members of the association. The presentation speech was made by Robert E. Lee, secretary.

The other officers elected were: Vice-president, Webster Coburn, Dorris Motor Car Co.; treasurer, J. T. Salisbury, Moro Automobible Co.; directors, Philip H. Brockman, G. W. D. Donnelly, Supreme Motor Co., Stutz distributors; F. H. Fahenkrog, Nardell Motor Co., Reo distributors; E. A. Hatfield, Mississippi Valley Motor Co., Oakland distributor; P. S. Russell, Packard Motor Co. of Missouri, and H. W. Spalding, Chevrolet Motor Co.

DOTY WITH PREMIER

Indianapolis, April 14—Harry Doty, formerly branch manager at Chicago for the Haynes Automobile Co., has been appointed sales manager for the Premier Car Corp. with headquarters at the factory here.

"Call of the Open Road Week" May Supplant LosAngeles Show

Success in Creating Interest Leads Dealers to Think of Semi-Yearly Event

LOS ANGELES, April 14—An as innovation for creating interest in motor cars the "Call of the Open Road Week" has proved so successful that it has given the dealers a new thought. It is that similar events be held twice yearly and supplant the annual automobile show. The crowds that have visited the salesrooms have been immense and as all interest and attention at one time centers on a single make of car the sales atmosphere created is better for real business than at the combined shows, in the opinion of dealers.

The week was opened with a parade through the business district. Entries were limited to two models of each car, floats, music and trucks. The parade was about four blocks in length and the city authorities cooperated by giving a right of way for traffic. The parade moved on time and cleared the streets quickly so there was no complaint from any source. Each noon-hour since the parade has been limited to the floats and vehicles transporting musicians. One afternoon there was a women's driving contest at Exposition park and the audience numbered thousands.

Award Prizes for Decorations

Places of business were decorated with outdoor scenes and the cleverest work along this line ever seen in the city was developed. Some of the dealers spent as much as $1500 on their displays. The object was to show the connection between the motor car and the out-of-doors. In the evening a variety of entertainment was provided. This included indoor golf contests, dancing, singing and motion pictures. Twice during the week red fire was burned along the "row" and the glare let everybody know there was something doing. Prizes were awarded for the best decorated windows and showrooms. Into one of the displays was incorporated a pool with mountain trout. Another reviewed the history of transportation.

Pullen to Drive One of Four Duesenbergs at Indianapolis

Indianapolis, April 14—Eddie Pullen, winner of the Grand Prize at Santa Monica in 1914, has been selected by Fred Duesenberg as one of the pilots to guide the destinies of one car of his fleet of four in the 500 mile race to be held at the Indianapolis motor speedway on May 30. Pullen will team with Roscoe Sarles, Jimmy Murphy and a driver yet to be named.

Drivers are showing great interest in the added $20,000 lap prize fund to be subscribed by the citizens of Indianapolis. This is in addition to the $50,000 purse offered by the speedway management.

Financing Company System Approved by Bank Executive

New York Financier Tells of Factors in Which Future Success of Industry Depends

NEW YORK, April 14—The system used by automobile financing companies was approved by Charles Elliott Warren, vice president of the Irving National Bank, in an address at the Automobile Club of America. In a discussion of the automotive industry he said:

"The enthusiasm of the buying public has enabled many manufacturers to pass through, without difficulty, situations with which from now on they will be confronted and will have to meet on a new or different basis.

"The dealers who relied upon local banks before the peak of restriction in credits, turned with a rush to the automobile finance corporations, acceptance corporations and others. There are now more than 110 of these corporations operating in the United States—some local, some state-wide and some national. Between 45 and 50 per cent of all cars being sold today are marketed on some form of a deferred payment system. Without doubt the methods or system used by these companies in financing both the wholesaler and the retailer are a logical financial sequence and eventually place automobile paper in the same class with any other commercial paper—but back of it must be analyzed the integrity of the company and the dealer.

What It Means to the Country

"Briefly speaking the meaning of the automotive industry is first—**Transportation,** involving the use of the truck for the short haul and for the long haul and the saving to the railroads; second—**The Family Automobile** for the saving of time and the carrying of supplies and the pleasure vehicle; third—**The Development of the Farm,** the tractor, haulage of supplies and product—the economic value to agriculture."

ADD MILLION IN NEW JERSEY FEES

Trenton, N. J., April 14—Increases in motor vehicle fees to bring the state additional revenue of about $1,200,000 a year have been authorized by the legislature.

It was provided that the minimum fee shall be $4 for a car of ten-horsepower or less. From ten to thirty horsepower the fee will be at the rate of 40 cents a horsepower, and above that 50 cents a horsepower. The fees for trucks will be based upon capacity, the smallest fee to be $10 for trucks carrying 1,000 pounds or less. The rates increase up to $99 for trucks of 30,000 pounds capacity.

10,000 TRUCKS IN MICHIGAN

Grand Rapids, Mich., April 14.—E. Foster Moreton of Detroit has been named president of the Michigan Highway Transportation Association which met in convention here. Sixty commercial truck operators representing 15 counties attended the convention. It was brought out during the meeting that approximately 10,000 commercial trucks are in use in Michigan besides 2,500 busses and 1,500 teams engaged in commercial hauling.

It is the plan of the association, which was formed as a branch of the National Team & Motor Truck Owners Association, to stabilize the commercial hauling industry to cooperate with state and local officers in regulating loads on highways and to stabilize rates and prevent illegal practices in the sale of trucks.

ONE MILLION MORE FROM TAX

Lansing, Mich., April 15.—An increase of more than $1,000,000 in license money received from the motor vehicle tax during the first three months of 1921 as compared with the same period in 1920, is shown in a report filed with the auditor general yesterday. The total collected this year was $4,497,723.78 compared with $3,468,891.50 last year. Of this total $2,248,861.64 is returned to the counties for highway work, and the other half is diverted to the State Highway Department.

Taxes on foreign owned cars during the first three months amounted to $1,489,-028.66 approximately $200,000 more than last year.

PHILADELPHIA THEFTS INCREASE

Philadelphia, April 14—Since Jan. 1 of the present year, 654 automobiles, valued at $1,139,241, have been stolen in Philadelphia. Of that number, 201 cars, valued at approximately $250,000, have not been recovered. Records kept by the city detective bureau show that motor car thefts have been increasing. During January, 160 cars were stolen and 107 recovered; February, 145 cars stolen and 97 recovered; March, 271 cars stolen (a new high record) and 198 recovered and up to April 8, 76 cars stolen and 51 recovered.

Can Give No Service Until Owner Shows Registry Card

Wisconsin Legislature Has Bill, Purpose of Which is to Prevent Thefts

MILWAUKEE, April 15—"Is the tail going to wag the dog?" is the question being asked by dealers, service men and even gasoline station managers in Wisconsin, whose legislators are at present contemplating an almost innumerable number of proposals before the Wisconsin legislature calculated to safeguard the public, the insurance companies and everybody else excepting the automotive industry.

A bill, on which hearings will be held shortly and which bids fair to pass and be signed by the governor, as a preventtative for thefts of passenger cars and trucks, contains the following provisions:

The owner must get, in addition to the usual state certificate of registration, a county registration card. A check-up system of monthly exchange of the names of registrations is to be operated between the secretary of state and the county clerk, police, sheriffs and assessors.

Every owner of a garage, storage, service station or gasoline filling station, is never to give service of any kind without having seen the registry cards of the owner. Each must keep a card record of all transactions, showing the name of the owner, registry number and engine number of the car. The owner of the car must show the certificate before he may recover, buy or otherwise secure service. These records are to be open to public inspection at all reasonable hours. For out-of-state passenger cars, trucks, etc., a separate record will be kept.

Fines for violations of the proposed law are from $5 to $100 each offense, or count. Or, says the bill, from 10 days to three months in jail; or, both.

Stickers to Help Good Roads Movement

CHARLESTON, S. C., April 18—As part of its intensive publicity campaign in promotion of good roads, the Charleston Automotive Trades Association has issued a sticker to be placed on the windshield of the automobiles of the city reading as follows:

Build

Good Roads
Charleston Automotive
Trades Association

The sticker is printed in red ink on a white field and will go a long way toward furthering the building of highways. Three thousand of these posters were distributed within a few days.

The association is also active in the movement to make Charleston "A Well Paved City" for in addition to the above poster it has issued another poster for windshield sticking printed after the same manner and reading:

Let's Pave Our Streets
And
Put Charleston On The Level
Charleston Automotive
Trades Association

A placard bearing the same wording has been prepared for shop window distribution.

Dealers in Milwaukee Outline Plans for Detroit Conference

Contracts, Discounts and General Policies Will Be Laid Before Manufacturers in May

MILWAUKEE, April 15—"There will be a conference at Detroit, May 9, by a committee of the National Automobile Chamber of Commerce and a committee of the National Automobile Dealers' Association, and that meeting will mark a new era in the history of the automotive industry," declared Jesse A. Smith, president of the national dealers' organization, at the annual meeting and frolic of the Milwaukee Automotive Dealers' Association at the Milwaukee Athletic Club, Tuesday. The Detroit meeting program is now being developed by the manufacturers on the one hand and the dealers on the other. Committees of five will meet separately May 8, preliminary to the joint session.

To sum up what the Milwaukee dealers believe should and can be accomplished at the Detroit conference:—

Tell the manufacturers that their interests are also the dealers' interests; that Milwaukee holds no brief for the "gyp" dealer, but that something should and can be done to decrease the mortality average of the automotive dealer.

Eliminate Cancellation Clause

Perfect and use a contract that will have a standing in a bank, eliminating the cancellation clause as the most serious thing the dealer has to contend with in every part and parcel of his activity and business, that many of the present features of contracts in use are undoubtedly the "hang-over" of the earlier days when the "gyp" dealer still held a part of the lime-light. Dealers feel that the present contracts are frequently no contract at all. More than one believes the contracts put dealers at the mercy and whim of the factory representative.

Take the mystery out of the cancellation features of contracts; remove all the doubtful phases. The trade needs more light and less mystery. Disagreements over cancellations or any other phase of contracts and contractural relations should and can be arbitrated; there is no real need for summary actions under one-sided contracts. A small board could look after such disagreements. Above all, eliminate the "personal disagreements."

Discounts were discussed, but no definite plan suggested.

Used Cars Poorly Merchandised

In the discussion of the used car situation it was asserted that there is probably no other business from electric flatirons up that takes back used articles on any such unbusinesslike basis as the automotive industry does.

It was clear that the dealers considered the nub of the proposition in the practice of taking cars back for more than they are worth. Yet, the dealer has to guess at values in such transactions. Some have better ideas than others, but all guess.

"There can be no stated value in used cars," it was asserted, "and the manufacturer and dealer must recognize this in attempting to solve the problem."

Discounts on parts, policies re service and other problems will come up at Detroit, judging by the discussions.

"During the war things got on a pretty decent basis as to service," it was stated. "But, how many dealers, anywhere, are on such a basis now? One sees signs up all over, busting up all that was accomplished. Are some dealers trying to figure out how much they can give away? By starting things, they force others into the same line."

Will Discuss Freight Rates

The question of freight rates was believed to be particularly appropriate for the Detroit conference.

If Milwaukee dealers have their way, manufacturers will be asked to help carry the financial burdens of the projects being put under way by the dealers of the country.

All officers of the Milwaukee association were re-elected.

New York, April 12—Arrangements were completed today by the National Automobile Chamber of Commerce, for the conference with the National Automobile Dealers Association, at which problems of the industry affecting both manufacturer and dealer are to be discussed. The conference will be held at the Detroit Athletic Club, Detroit, on May 9.

The following committee was appointed by President Clifton to represent the N. A. C. C. at the conference:

W. C. Sills, sales manager, Chevrolet; C. B. Voorhis, sales manager, Nash; C. W. Matheson, sales manager, Dodge; Hal B. Boulden, sales manager, Selden Motor Truck Co., and F. E. Connor, sales manager of Chandler.

TRACTOR PLANTS AFFECTED

Charles City, Ia., April 14—The Hart-Parr Co. will suspend operations for a time beginning the fifteenth of this month. Notice has been posted in the plant to that effect and that it seems unwise to continue manufacturing their product under existing conditions. As the notice states business is sound but it is, nevertheless, quiet at this time and buying is extremely light. The company will retain a number of the superintendents and foremen, who will look after the necessary work during the shutdown period. They hope to be able to give some encouraging news to the employees within the next 30 or 60 days.

Chicago, April 18—A circular to employees of the International Harvester Co. has notified them that the tractor factories will close May 1, by which time all of the company's products which could be sold this year will have been manufactured.

Existence of International Theft Ring Charged at Trial

Government Claims Automobiles Stolen in Detroit Were Shipped East for Shipment Overseas

DETROIT, April 14—Roscoe Benjamin, said to be a millionaire automobile dealer of Winsted, Conn., has been summoned to Detroit to testify in the trial of the alleged international automobile theft gang charged with stealing automobiles in Detroit and selling them in eastern cities for shipment to foreign countries. Benjamin's name was brought into the case by testimony of Joseph Rafter, New York City, an automobile dealer.

Rafter testified he bought a limousine from Benjamin which he sold to a Columbia university professor and which later was seized by the government officials on the ground that it had been stolen by one of the members of the ring in Detroit. Rafter also said a touring car in Benjamin's salesroom had altered engine numbers. This car also will figure in the trial, it is said.

Four witnesses have been brought to Detroit from New England states to testify in the case in the effort to prove that cars alleged to have been shipped to Europe by the ring had altered engine numbers. These witnesses are expected to testify as to serial numbers of cars now in their possession which government attorneys say are identical with numbers of cars seized in Sweden, said to have been stolen. Government attorneys also maintain these witnesses will be able to show how and by whom the numbers were changed.

Officials of the Cadillac Motor Car Co. testified Saturday that records of the company regarding cars alleged to have been stolen by the ring had been tampered with. The government contends this was done by members of the ring as yet under cover.

The defendants now on trial are J. G. Burroughs and E. F. Schanley, automobile dealers, and Jack White of Bridgeport, Conn. Sven Nyquiest, accessory dealer of Brooklyn and Joseph Galvo, Douglas Moore, Earl Lynn, Albert Hughes and Richard Going of Detroit.

Further arrests in the theft ring case are expected in a few hours as the result of the apprehension in Chicago in Sunday of six men declared to be members of the ring.

DES MOINES AGAINST DUMPING

Des Moines, April 14—The Motor Trades Bureau of the Des Moines Chamber of Commerce has adopted the anti-dumping resolution sent by the N. A. D. A., and has forwarded copies to United States Senators from Iowa and the local representative in Congress. The resolution concerns the shipping back to this country of motor merchandise salvaged from the war areas in Europe and purchased from European governments by private firms.

Fuel Consumption Tests in France for All Stock Types

Six Different Classes of Cars Provided for Trials on Grand Prix Course

BY W. F. BRADLEY
European Correspondent of MOTOR AGE.

PARIS March 31—Rules for the French fuel consumption trials to be held on the Grand Prix course near Le Mans on May 21 and 22 provide for all types of stock automobiles (motorcycles and sidecars excluded), placed in six different classes. The idea of the competition is to put the cars on an equality at the outset, by giving them an allowance of gasoline or benzol according to their weight and piston displacement, and to send them away on a closed course, the winner being the one going the greatest distance.

To remove the freak element as far as possible, minimum speeds are insisted on for each lap of the course, and on the following day the cars will have to cover six laps of the course, or approximately 65 miles, at speed. Between the two trials the cars will be kept in a closed park, so that there can be no change in the carbureter adjustment for speed work. Last year this was not insisted on, and every competitor had a special carbureter setting for the speed trials. Simultaneous starts will be made, and the 10½ mile course will be divided into hundred yard sections, each one in charge of a controller, who will see that no fuel is taken aboard during the trials. A uniform type of tank must be employed, and all lines from the standard tank must be removed before the start. Any kind of fuel can be employed, or any mixtures of different fuels, according to the desire of the competitors. The cars being on a theoretical equality at the start, the one covering the greatest distance will be the winner, subject, of course, that he has maintained the minimum average speed. The following day's speed trials will not serve to divide the competitors, but will merely prove, by the speed attained.

The following table shows the maximum piston displacement for each class, the base weight, the gasoline allowance, and the minimum speed. Corrections will be made in the fuel allowance according to variations in piston displacement, and according to increase or decrease in weight.

	Piston dis. cu. in.	Weight lbs.	Gas, gals.	Min. speed
Class 1	67	1212	1.3	15.5
Class 2	85	1873	1.6	18.6
Class 3	122	2535	1.9	21.7
Class 4	183	3086	2.2	24.8
Class 5	274	3527	2.5	27.9
Class 6				
More than	274	3857		31.

LEXINGTON GETS SPRING PLANT

Connersville, Ind., April 14—The Ansted Spring & Axle Co. has been organized as a subsidiary of the United States Automotive Corp., of which Frank B. Ansted, head of the Lexington Motor Co., another subsidiary, is president, and has acquired the property in Connersville formerly owned by the Standard Parts Co. The authorized capital stock is $500,000. All Lexington springs will be made in this plant, in addition to a considerable volume of business for other motor car manufacturers. The plant was originally owned by a company bearing the same name as the new owners and was sold to Standard Parts in 1916.

Goodyear Reduces Common Capital Stock to One Million

Akron, April 14—The special meeting of stockholders of the Goodyear Tire & Rubber Co. to ratify the reorganization plan is being postponed from day to day pending the completion of preliminary details. Negotiations for the refinancing have been definitely consummated, however. It is understood that Goldman, Sachs & Co. of New York will head a syndicate which will offer $25,000,000 in 20 year 8 per cent first mortgage bonds while Blair & Co. will head a syndicate to offer $25,000,000 in 70 year 8 per cent debentures.

The company has filed with the secretary of state of Ohio articles reducing its common capital stock from $100,000,000 to $1,000,000. This is said to be merely one of the steps preliminary to refinancing.

Chain of Filling Stations For 21 Cities in Wisconsin

Milwaukee, Wis., April 18—The United Consumers Corp. has started work on the construction and equipment of gasoline filling stations, oil and supply stores in twenty-one Wisconsin cities, the first of which will be ready to sell to consumers by May 1. Each will be of uniform design and size.

Austin, Texas, April 14—No branch of the automobile industry has experienced more development in Texas during the last two years than that of building filling stations. This expansion of the local marketing feature of the larger as well as the smaller refining companies is not confined to the larger cities but is found in practically every town, down to 5,000 population and less in the state. It is estimated that in Dallas alone nearly $1,500,000 has been invested in new filling stations for motor vehicles during the last few years. There are sixty-four such stations in that city.

ABSTRACTS IN CAR DEALS

Lansing, April 14—The Condon bill which establishes a system of abstracts governing all transactions of automobiles which was passed by both houses of the legislature, was approved yesterday by Governor A. J. Groesbeck. The measure is one which was offered by the Detroit Automobile Club and other automobile interests in the effort to put a check on thefts in Michigan.

Ford is Producing 3,300 Daily; Year's Plan Calls for Million

Company Now Has 102,000 Unfilled Orders on Books—Fewer Men Employed

DETROIT, April 14—With the Ford Motor Co. hitting around 3,300 daily, unless something unforeseen intervenes to check production, approximately a million cars will be turned out at the Highland Park factory this year. Since the plant resumed operations in February there has been a steady increase in production and two weeks ago Ford officials announced that the company at that time was putting out above 3,000 cars. It is the intension of Ford officials to continue to increase the output until the plant capacity of more than 4,000 daily is reached.

It was announced at the Ford office this week that the company now has 102,000 unfilled orders for automobiles on its books. The plant built 80,000 cars in March and the April output is expected to reach close to 100,000. Actual sales in the domestic market in January were 57,208 automobiles and 1,138 tractors according to official announcement. In February 63,603 cars were sold and 1,932 tractors. In March the sales were 87,221 cars and 4,708 tractors. The April sales according to the announcement give promise of being considerably above those of March.

Normal production of the Ford company prior to the shut down in December was about 100,000 cars a month. In turning out this number approximately 52,000 employees were on the payroll. With the company averaging around 3,300 daily today and at least once within the last week reached practically the 3,500, there are but 32,000 men employed. Henry Ford said the difference represented employees taken on during the war during the expansion of activities,

DEALER DIES IN COLLISION

Buffalo, April 14—Frederick A. Henderson, president of the Henderson-Paige Motor Co. of Buffalo, met death in an automobile accident here. The car in which he and one of his salesmen were riding collided with a truck near Lockport. Mr. Henderson was thrown from the automobile suffering a fractured skull which caused almost instant death. The salesman was slightly injured.

INDIANA TRACTORS $100 LESS

Anderson, Ind., April 15—The Indiana Silo & Tractor Co. has reduced the price of the Indiana tractor from $1,090 to $990, made possible, according to the announcement from the factory, to late reductions in raw material.

CADILLAC PRICES TO STAND

Detroit, April 14—R. H. Collins, president of Cadillac Motor Car Co., has announced that Cadillac prices will remain unchanged throughout 1921.

Concerning Men You Know

Harvey J. Woodard has resigned as vice-president in charge of sales of the Republic Rubber Corp. of Youngstown and as president of the Canton-Blackstone Co. of Canton, Ohio, its affiliated subsidiary. Previous to joining the Republic corporation, Mr. Woodard was with the Knight Tire Co. of Canton, as sales manager.

Wallace O. Durell has been appointed representative of the Quaker City Rubber Co. in the Boston territory.

A. H. McIntyre, formerly secretary of the Bay State Automobile Association, has been appointed special representative of the Haynes Automobile Co. in the territory comprising New England, eastern New York and the province of Quebec.

H. I. Barber has opened the International Sales and Service store in Ottawa, Ont., with A. D. Lane as sales manager. The seven models of the International truck will be handled and a gasoline service station is being installed.

Edward J. Tallant, for many years identified with the oil trade in Philadelphia, has been elected president and general manager of the Tallant Co., Inc., Philadelphia distributors of Lambert cord tires.

Neal Jewett, formerly service manager of the Harrolds Motor Car Co., New York, has organized the Jewett Machine Co., Inc., general automobile machinists, Long Island City.

James G. Harper, for the last eleven years identified with the Beck-Hawkeye motor truck works at Cedar Rapids, Ia., has been made general manager of the concern through a change in ownership. The firm will operate in the future under the name of the Hawkeye Automobile Finishing Co.

R. C. Hawley has rejoined the sales staff of the Remy Electric Co. and will work under the supervision of G. B. Stone, general sales manager.

H. S. Tucker has been appointed sales manager for the Terre Haute branch of the E. W. Steinhart Co. of Indianapolis, Cadillac distributor.

R. H. Losey, well known in automobile circles, Indianapolis, has been named as one of the reserve judges for the new court of commercial arbitration which has been established by the Indianapolis Association of Credit Men. He will handle business disputes arising in the automobile industry.

W. J. Jamison, who has been superintendent of the Delco Light Co.'s plant at Dayton for the last five years, has been appointed factory manager of The Kelly-Springfield Motor Truck Co., succeeding L. P. Kalb, resigned.

K. E. Voelter, for the past five years factory representative in Indiana for the Pennsylvania Rubber Corp., has become associated with the Bearings & Accessory Co. of Indianapolis, and will act as special representative for this concern.

Joseph L. Hardig, advertising manager of the motor bearing division of the Hyatt Roller Bearing Co., and previously assistant advertising manager of the motor equipment division of the General Motors Corp., has joined the staff of the Campbell-Ewald Co. to assist in sales promotion work.

C. E. O'Mera, formerly district manager for Maxwell branch at Houston, Texas, has been made sales manager for the Texas Paige, with headquarters at Dallas.

L. M. Cregor, formerly sales manager for the Keither-Patterson Motor Co. of Dallas, has been elected vice-president of the concern and placed in charge of the service department. Charles H. Potter will succeed him as sales manager.

Charles Crawford has resigned as vice president of the Premier Motor Corp., Indianapolis, to enter into business as a consulting engineer.

Harry Murphy, formerly in charge of the sales for the Prest-O-Lite Co. at Indianapolis, has been made president of the Permalife Storage Battery Co.

Stanley E. Knauss, for the last two years sales and advertising manager for the Continental Aircraft, Inc., has been made sales manager of the Stout Engineering Laboratories, Inc., Detroit. Production of the new Stout commercial airplanes will begin shortly in the Detroit plant.

E. C. Heid, formerly connected with the Cole Motor Agency of Philadelphia, has been appointed district representative of the Flexo Co. of America, subsidiary of the Hudson Motor Specialties Co. for Indiana.

L. E. DeGroat, formerly of Timken-Detroit Axle Co., has joined the Acme Motor Truck Co., Cadillac, in charge of dealer promotion work.

George Schwalbe of Hartford, Wis., has opened a factory for the manufacture of commercial car bodies, truck cabs, and similar specialties for passenger and commercial cars.

John E. Tracy, who served four years as general sales manager of the Sterling Motor Truck Co., has resigned to accept the position of vice-president and director of sales of the Hicks-Parrett Tractor Co., Chicago Heights, Ill., a new $3,500,000 concern which is manufacturing heavy duty truck units and fire apparatus. Mr. Tracy was the first president of the National Association of Motor Truck Sales Managers, in the organization of which he took a leading part. He assumed his new duties April 4.

C. M. Eason, vice-president of the Hyatt Roller Bearing Co., has become associated with the Samson Tractor Co., Janesville, Wis., as assistant to President J. A. Craig and supervisor of the engineering department.

Confidence in "Other Fellow" Factor in Tire Dealer Success

Cleveland, April 14—"The time to do your spring housecleaning is now. Get 'oriented' and pluck a bud of strong determination to fight this battle for cleaner and better business shoulder to shoulder with the 'other fellow.' Have faith, confidence and above all a strong determination to be a real tire merchant," says Philip O. Deitsch, secretary of the National Tire Dealers' Association, in an open letter addressed to tire dealers. The association was formed during the national automobile show held in Chicago this year.

He states that many tire dealers are drifting aimlessly and have permitted unethical practices to creep into their business. He holds that the "one great trouble with so many tire dealers of today is that they have not developed what they had and even now are not using the power at their command." Armed with determination with a definite goal in mind, high aims, faith, backbone and confidence in a just measure in the "other fellow," the tire dealer, Mr. Deitsch says, should be a successful tire merchant.

DELAWARE'S ROAD PROGRAM

Wilmington, Del., April 14.—The legislature, which closed business this month, so pared down the road building appropriation that the Highway Commission cannot carry out the extensive program it had planned. About all it can do is to finish the main through roads that have already been arranged for, leaving the proposed laterals alone. Had the appropriation asked been given the counties could have been given funds, which they would have matched, thus adding to the state's work from county funds, but this is impossible under the circumstances.

THIRTY-TWO DEALERS ORGANIZE

Taylor, Texas, April 14—The automobile dealers of this city have just organized what is known as the Taylor, Texas, Automotive Trades Association. The initial membership is 32 and consists of practically all the automobile dealers, garagemen, tire men, repair men and vulcanizers in the city. The organization is for the purpose of promoting the interests of the local dealers and cooperating with similar organizations over the state. J. D. Bell was elected president and J. A. McKinney was made secretary and treasurer.

Firestone, Batchelder and Rands, Old Timers Directors

Flint, Mich., April 15—Harvey S. Firestone, A. G. Batchelder and W. C. Rands of the Motor Products Co. were added to the directorate of the Old Timers' Club at a meeting of the board here. The directors were divided into three classes to serve one, two and three years.

It was decided to divide the membership into three classes, which will be: Junior, from five to ten years' continuous service in the automotive field; senior, ten years' and more continuous service; associate, consisting of owners up to 1906, inclusive.

Albert Champion, the president, appointed W. S. Gilbreath, manager of the Detroit Automobile Club, chairman of the committee on constitution and by-laws; J. E. Schipper, engineering editor at Detroit for the Class Journal Co., chairman of the membership committee; Lloyd Maxwell, chairman of the entertainment committee, and W. C. Rands, chairman of the finance committee.

Transfer Cadillac Offices in Detroit to New Quarters

Detroit, April 14—General offices of the Cadillac Motor Car Co. now are in the new Cadillac plant on Clark avenue. The purchasing, accounting, manufacturing, sales and advertising departments began to function at the new home Saturday.

Some idea of the size of the plant may be gained when it is known that all factory operations which heretofore have required 77 buildings in Detroit, will be carried on in it. There are eight large buildings, chief of which is the manufacturing building, 800 by 600 feet, with a floor space of 970,000 square feet. Raw materials are received at one end and the Cadillac chassis leaves under its own power from the other end. Conveniently near the manufacturing building is the heat treatment building 500x80 feet. The assembly building, second largest in the row, is 800 by 300 feet with a floor space of 620,000 square feet. The storage building which adjoins the assembly building is 480 by 140 feet and has storage space for 1,000 Cadillacs.

FIFTEEN YEARS AS DEALER

Philadelphia, April 14—In celebration of their association in business for the last fifteen years, Samuel S. Thornton and Lawrence C. Fuller, of the Thornton-Fuller Automobile Co., dealers in Dodge Brothers' cars, were tendered a surprise dinner by the department executives. The dinner was followed by a dance, participated in by all the employees.

John N. Willys Day at Plant Will Bring Dealers Together

Part of Plan Made by Willys-Overland Head to Encourage Drive for Sales

TOLEDO, April 16—One of the first of the old-time dealer meetings is scheduled to be held at the Willys-Overland Co., administration building here on Friday, April 22. That day will be known as John N. Willys Day, and hundreds of dealers from all parts of Ohio, Michigan, Indiana and West Virginia will come to Toledo to meet the factory executives and drive away a fleet of cars.

Last Friday a six weeks' sales campaign and contest was started with a number of prizes offered by Mr. Willys. Following the new plan started two weeks ago by President Willys, last week he went into the southern states to meet dealers and encourage them in a drive for sales. He stopped on Thursday at Charlotte, N. C., and on Friday at Atlanta, Ga., meeting hundreds of salesmen in adjoining states who came in to renew acquaintance with the chief.

Next week he will continue his trips and will strike towards the middle western states again holding a big meeting at Indianapolis the day before coming to Toledo for the big factory reunion. Willys has been accompanied by E. N. Culver, assistant sales manager on his recent trips.

Putting on More Men

The Overland is rapidly approaching the 5,000 mark in number of employes at work. The working week has also been extended to six days to catch up with orders. The number of unfilled orders on Overland fours and Willys-Knights was largest this week since last summer, an official reported.

Several departments of the Willys-Overland plant at Elyria, Ohio, will be opened this week to take care of the increased production at the Toledo plant. The Elyria plant manufactures Knight engines as a specialty. More than 200 men have been put to work, and the number will be increased each week as production grows. The plant at Elyria is the largest in that city and had been remodeled to produce engines on a large scale before the business depression came.

ERSKINE N. A. C. C. DIRECTOR

New York, April 14—A. R. Erskine, president of the Studebaker Corp., has been elected a director of the National Automobile Chamber of Commerce to succeed C. W. Churchill of the Winton Co., who has engaged in other business.

HEADS G. M. C. ADVISORY STAFF

Detroit, April 15—C. S. Mott, vice-president and director of General Motors Corp., has been made chief of the Advisory Staff with headquarters in the General Motors building, Detroit, with the title of executive vice-president. Mr. Mott will take over the duties which heretofore devolved upon Alfred P. Sloan, Jr., New York, who found it impossible to devote the time necessary to corporation affairs in Detroit. In his new capacity Mr. Mott's duties will be similar to those of a field marshal in the army. He will direct the efforts of the executives who have been selected for the directorships in the various departments and who in turn will direct the policies of those particular departments in the various units of the corporation. Mr. Mott, whose home is in Flint, already has taken up his duties in Detroit.

Citizen Lap Prize Fund for Indianapolis Race Started

Indianapolis, April 14—The committee which will have charge of subscriptions to the citizen lap prize fund for the Indianapolis race met yesterday at the Chamber of Commerce and considered plans for completing the work already begun. According to the reports of A. H. Adams, chairman, the responses already received from the original donors of the 200 lap prizes given at last year's race have been most gratifying.

A second meeting will be held soon at the Chamber of Commerce, when complete reports of all former subscribers will be received, and the names of those who attempted to subscribe last year, but were too late, will be distributed. The fact that the pledges so far received were the results of circular letters only and that there had been no personal solicitation cheered the men and convinced them of a most cordial response from the majority upon whom they will call in the next few days.

Rickenbacker Will Fly There

Following the announcement that Eddie Rickenbacker, former racing driver and premier American ace of the world war, was to fly from Oakland, Cal., to Indianapolis to attend the automobile races, a committee was appointed by the Marion County council of the American Legion for his reception and entertainment in Indianapolis.

NEW MICHELIN CORD SIZES

Milltown, N. J., April 14—The Michelin Tire Co. has added two new cord sizes, a 30 x 3½ soft bead clincher and a 32 x 4. The former size fits all 30 x 3½ clincher rims and is considerably oversize, being actually 31 x 4. The price is $30. The 32 x 4 regular size cord is $37, which is only $3.50 more than the fabric tire of the same make and size. A reduction in the price of the 32 x 3½ cord from $40.70 to $37.50 has also been made. This size fits the Dodge and other cars.

MOTORWHEEL PRICES REDUCED

Milwaukee, April 14—Briggs & Stratton Co., manufacturers and distributors of Motorwheel, announce a new schedule of prices on its products as follows: motor scooter, $150; motor wheel, $100; flyer complete, $200.

Ford Wipes Out Bank Debt and Has Millions in Cash

Rapid Turnover Is Made Possible By Economy Practiced in Manufacturing End

NEW YORK, April 15—One of the most remarkable financial comebacks in the history of the automotive industry has been staged by Henry Ford. Only a few weeks ago financial circles in this city were asserting positively that he would have to negotiate a large loan at the banks upon the banker's own terms but no similar prediction ever was farther from the actual facts.

Ford not only has been able to avoid asking the banks for new financing but he has just paid $25,000,000 in notes a few days before their maturity. This wipes out the bank negotiations. Besides paying the bank notes standing against him, Ford has discounted his April trade acceptances and last Thursday had $8,000,000 in cash.

It is confidentially believed that Ford will have ample cash to meet his trade acceptances for May but if he is unable to clean them all up on the due dates, Detroit banks have agreed to extend him all the accommodation necessary for a brief period. In addition to meeting his bank loans and merchandise obligations, Ford paid his quarterly income tax installment before it was due.

The marvelous rapid turnover in cash in the Ford treasury for the past two months has been due in large measure to the fact that his traffic department has worked out a plan under which deliveries which formerly took 18 days now are made in 8 days. Increased labor efficiency has made it possible to operate the plant at approximately 80 per cent of capacity with 60 per cent of the normal labor quota. Overhead costs have been cut to the bone. This process has gone so far as to discontinue some of the telephone trunk lines which ran into his factories and surplus office equipment has been sold.

The prices of all materials used in the manufacture of Ford cars have been materially reduced and this has added a substantial sum in the aggregate to the profit on car sales. These manufacturing economies were what finally turned the scales and they will permit continued large scale operations without further financing except, perhaps, for temporary loans of comparatively small sums by Detroit banks.

DRIVERS' SCHOOL IN CHICAGO

Chicago, April 15—A motor drivers' safety instruction course will be inaugurated here on April 19 by the Chicago Safety Council. The object is to give practical, definite instruction in safety, rules of the road and mechanical operation of motor vehicles. Meetings will be held at the Chicago Oneida Truck Co. service station, where it is possible to take care of 1,000 persons, every alternate Tuesday.

A Department of BETTER BUSINESS

A dollar will be paid for all ideas accepted as Better Business—Perhaps you have some.

Conducted by Ray W. Sherman

He Makes Them Think

HAS any dealer who reads this idea been troubled with men who do not think? Do you have any difficulty in getting your men to keep awake, to watch for business, to use tact in selling or meeting customers, and to devise means of overcoming difficulties? Motor Age publishes a number of Better Business Ideas and shop kinks each week and pays $1 for each. No doubt your men sometimes glance at them but would get much better results if they studied them carefully. Why not offer a prize to the man who could think up and sell the most ideas in a month? You might furnish the services of the stenographer free. Not only would they read and study other men's methods but begin to dig up ideas of their own and put them into practice in the business. It has been tried and the result of the first check was worth many times the effort put forth.

A Dealers' Magazine in a Newspaper

Distinctively different advertising, which, because of its novelty and interest, would attract a lot more attention than the ordinary kind of advertising, might be done by the dealer in this way: In the regular advertising space used by the dealer he might publish a little "automobile magazine" of his own. He might call this publication "Local Automobile Topics" and in this he might include short, snappy little paragraphs telling what owners of cars sold by the dealers are doing, mileage records made by owners, new cars sold, interesting trips taken and other material of that sort. Of course, every item should boost the dealer and his cars either directly or indirectly. Such material would be widely read because of the personal nature of the items and should help the dealer's business considerably.

Local Trip Booklet as Advertising Medium

Road guides and books of trips are prized by the majority of motorists. This being the case it would be a good stunt for a dealer to get out a little pamphlet of "Local Trips," in which he would give road directions for week-end and Sunday afternoon trips in the vicinity of his city and in which he would also give directions for the longer trips which are most favored by local motorists. Of course, his own advertising matter would be an important phase of the book.

The book might be distributed free to all people calling for it and giving their name and address, and when these motorists called it would be an easy matter to find out whether they were automobile prospects or not. Such a stunt would make the motorists feel that the dealer sure was a live wire and would, therefore, be a good thing for the dealer in addition to giving him some advertising which would be seen by the motorists every time they referred to his book. The expense of getting out such a booklet would not be very large.

Car Inspection Boosts Repair Work

A well known automobile dealer boosts the volume of his repair business by inspecting each car before it leaves the repair shop. At the left hand side of their repair order, a list of the common ailments of a car is printed. At the top of the list these words are printed: SAVE MONEY. WE HAVE INSPECTED YOUR CAR AND FIND THAT YOU WILL SAVE MONEY IF YOU TAKE CARE OF THE ITEMS CHECKED BELOW BEFORE THEY CAUSE TROUBLE. Any slight defect is checked on the list. The inspection is a booster for the repair business, and a convenience appreciated by the car owner.

Finding a Place Where Car Can Be Kept

"You buy the car, we'll find a place for you to keep it." This slogan might help a lot of dealers get business in those residence sections where all the barns and garages and other buildings which can be used to house cars are occupied. Sometimes a prospective buyer holds off on buying a car simply because there is no place handy to store it. In such a case it would pay the automobile salesman to get busy and skirmish around and find such a place. It would be even worth while, in extreme cases, to purchase a portable garage, erect it on some convenient spot and then rent it out to the car owner until he could find some other place for his car.

Using Tire Sections for Advertisements

Every tire dealer has on his counter one or more sections of the tires he sells. Customers when they come in, whether interested in tires or not, are usually attracted to these sections, and inspect them while they are waiting to be waited on. Now, the inside of such sample sections represent good advertising space, and a printed card, cut to fit, may be inserted in them so that the customer cannot help but read. The outline of such a card should be egg-shaped with the small end cut off. The beads of the section should be fastened together with a rubber band to hold the card securely in place. White lettering on a black ground is best, and the wording, which should be changed frequently, should be something like—"This Space Reserved for the Air That Will Fill the Toughest Tire in the World," or "A Lucky Tube That Rides With the ——," or "Wouldn't Skid in a Tub of Grease—The ——. Notice the Deep-cut Thread?" These cards can be made by the dealer himself without any trouble.—A. D. Keogh, Springfield, Ohio.

Automobile as Prize in Spark Plug Sale

Motor Inn Co., of Holstein, Iowa, dealers in Fords and accessories, have inaugurated a scheme that is causing a sensational sale of spark plugs. Some time ago they announced that they would give away a new car to the person drawing the lucky number in their spark plug sale. With each spark plug sold, a number was given. When a certain number of plugs are sold, presumably enough that the profit will more than cover the cost of the car, a drawing will be held to find the winner. In the meantime, everyone is buying their spark plugs at the Motor Inn.

A Time Table to Show Usefulness of Car

Some folks who might be good automobile prospects except for their old-fashioned ideas about cars, still persist in believing that passenger cars are a luxury rather than a necessity. It might help to convince these folks of the need for an automobile in every wide-awake, alert, modern family to place the representation of a clock in the dealer's show window and to divide this clock into sections which might read like this:

"8 a. m.—Mother drives father to work.

"8:30 to 9 a. m.—Mother drives children to school on rainy days.

"9:30 to 11 a. m.—Mother uses the car for her morning marketing and shopping.

"Noon hour—Son takes car downtown so father can use it during afternoon.

"Afternoon—Father uses car in taking a business trip to nearby town."

Coupled with this might be some strong advertising matter telling how much joy the possession of a car adds to life.

Such a stunt would probably attract a lot of attention and would be a big help to salesmen in convincing folks of the necessity of owning cars, particularly at a time like this when it is so easy to dismiss the idea of buying a car by simply saying that the family doesn't need one and cannot afford one. The answer to this would be that the clock shows that the people who want to get the most out of life cannot afford to be without a car.

Sell the Farmer His Shop Equipment

Recently a dealer was unpacking a new hoist when a farmer customer asked him what it was worth. After telling the farmer he bought it for his own use and fooling around for awhile the farmer finally asked him to look up the price and bought the hoist. The dealer realized he had nearly slept through an excellent opportunity, so decided to profit by the experience and got busy and sold five hoists to farmers during the next week, so ordered in larger quantities and also saved on his own hoist. There are hundreds of places where a good hoist such as is used in many garages is useful on the farm. Likewise benches, vises and many other kinds of equipment for the private garage are easily sold.

Prizes for Essays Bring in Prospects

The King & Weaver Automobile Co. of Wichita Falls, Texas, distributor of the Nash car, has offered a $15 cash prize to the housewife living in Wichita county who writes the best 250-word letter on either of the subjects, "Why I Want My Husband to Buy a Car" or "Why I Want My Husband to Sell Our Old Car and Buy a New One." Already scores of letters have come in, most of them from wives of men who do not own cars. Judging from the expressions received so far, the distributor confidently expects that many of the reasons offered will be used on the husbands at home with the result that contestants who fail to win the prize may yet have their own cars.

Cashes in on the Activity of the Police

In many of the cities, and especially in the smaller towns, the light law violators are neglected for awhile and then rounded up in a bunch. In a small town several owners were notified one evening, so a dealer dressed up his windows the first thing in the morning with lighting equipment. The employees were called together and instructed to push light sales especially hard and to see that every car that came in was properly equipped and in proper working order. The campaign, which was accompanied by an advertisement in the local paper, netted good business.

How One Salesman Sells Delivery Truck

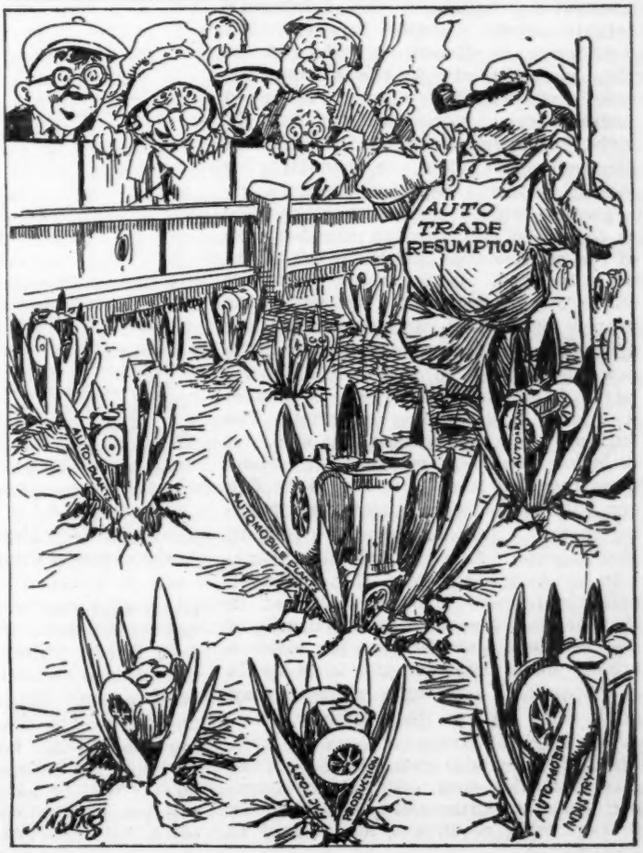
Here's the way one successful delivery truck salesman sells delivery trucks:

"I devote the mornings to calling on new prospects. I map out these calls the day before and I put them through, rain or shine. The more calls I make the more sales I make. During the afternoons I do the other things needed in my business—hunt up prospects which I have dated for seeing on that particular day, or give demonstrations or make deliveries of trucks. If there is nothing for me to do in the afternoon I follow the morning's procedure and call on more new prospects. All that a delivery truck salesman needs in order to sell delivery trucks is a list of the business firms in the city—which can be secured from the classified pages of the phone directory—and the ability to keep at it."

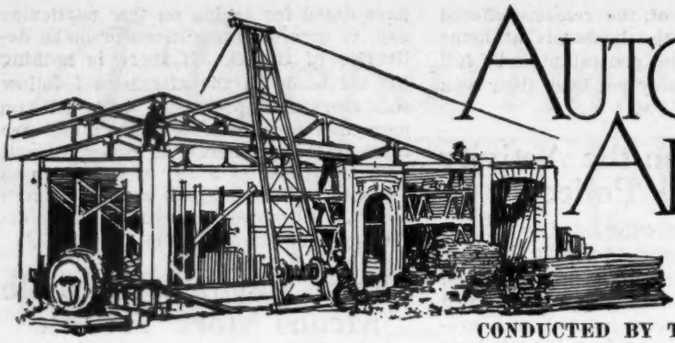
Down Payment Trouble Means More Trouble

Here are some interesting statistics compiled by an Indiana dealer in used cars. He has been in this business for a number of years and states that these figures have held true year after year. Where the purchaser hasn't money enough to make the required down payment or where he complains about the size of this payment and tries to get the dealer to take less, there is only a fifty-fifty chance that the customer will never satisfactorily complete the payments if the dealer lets him have the car. This is true no matter what the moral standing of the customer or how highly he is thought of by his friends. In other words, trouble over the down payments means that one out of every two of such deals will prove unsatisfactory. On the other hand, this dealer says that where the down payments are made without trouble that 90 per cent of the deals go through to a successful completion.

All You Neighbors that Have Been Waiting for the Frost to Get Out of the Ground Better Be Getting Your Seed In!



Do you question whether or not the automotive industry is under way again? This cartoon published in daily newspapers shows that the industry, among those industries which have taken part in the recent reconstruction period, is the first to show its head well above ground



AUTOMOTIVE ARCHITECTURE

Planning and Building Problems

CONDUCTED BY TOM WILDER

Using Hollow Tile for Building

SINCE hollow tile is becoming one of the principal building materials it will not be amiss for us to devote some space to a study of its characteristics.

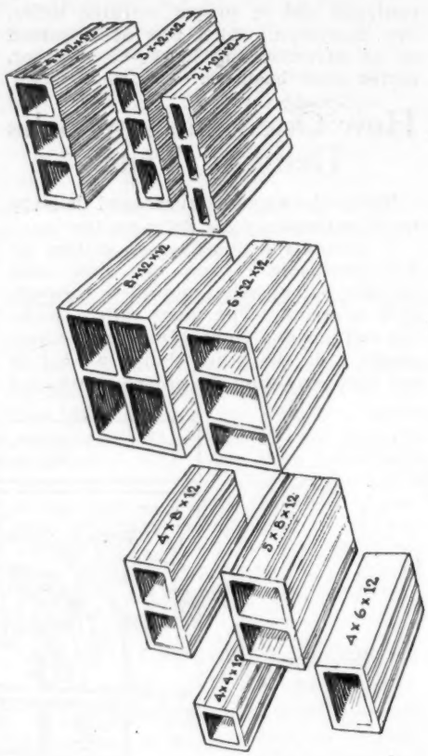
Being a natural clay product, there is a wide variation in the quality caused by the corresponding wide variation in the natural clay from which it is produced. The selling price of the finished product will not permit the cost of making additions to the clay for the purpose of improving its quality so that the clay must be used as it is found and if the tile is not a good grade for the purpose required another brand should be sought.

When the clay is mined or quarried, as is usually the case, it is sometimes left to weather over winter in a yard for that purpose. The weathering breaks it up into a finely divided state and washes out some of the detrimental soluble salts. Usually, however, this weathering is dispensed with and the clay goes directly to the mixing machines or blungers where it is mixed and tempered with water to just the right consistency to flow through the dies without sticking or crumbling or loosing its shape after leaving them.

There are two types of machine used to force the clay through the dies, one of the plunger type and the other of the propeller type. As the shapes are forced out through the dies they are cut to the proper length and carried away to the drying room. When thoroughly dried the raw tile is piled in the kilns and subjected to the heat necessary to convert it into a hard building material. The burning is a very particular step. A little too much heat may melt the whole mass together so that it has to be dug out with picks while insufficient burning makes it inferior in quality and off size because it hasn't completely shrunk.

It is a peculiar fact that although much more care must be exercised in the selection, preparation and burning of the clay for hollow tile than for common brick, volume for volume, it is as a rule as cheap and sometimes cheaper than brick when sold to the consumer.

There are of course reasons for this. First, the tile only uses about half the clay that brick does. Second, the burning takes proportionately less coal; an average burn requires a ton of coal to about 6000 lbs. of clay product and the light voluminous tile burns much easier than brick. Third, freight and handling charges are considerably reduced for the same reason. Fifth, after the consumer buys it he will continue to make a saving because the mason will lay double or triple the amount in a day and much mortar will be saved, probably seventy-five per cent of that used for common brick.



The peculiarity of all hollow tile is that its walls are always longitudinal. Being forced out through dies as it is, transverse walls are impossible and this fact limits to a certain extent the range of shapes possible. When it comes from the die the play is cut off into the right lengths by a mechanism in which a fine steel piano wire is the cutting member. The cuts can be made at an angle as in the case of arch blocks but this is about the extent of the range in end shapes.

The saving is not all "velvet," however, as hollow tile generally needs an outside finish unless one is lucky enough to find some that has a good looking smooth surface. Tile also needs reinforcing by filling with concrete and steel rods where it is to receive a great strain, these disadvantages offset some of its advantages.

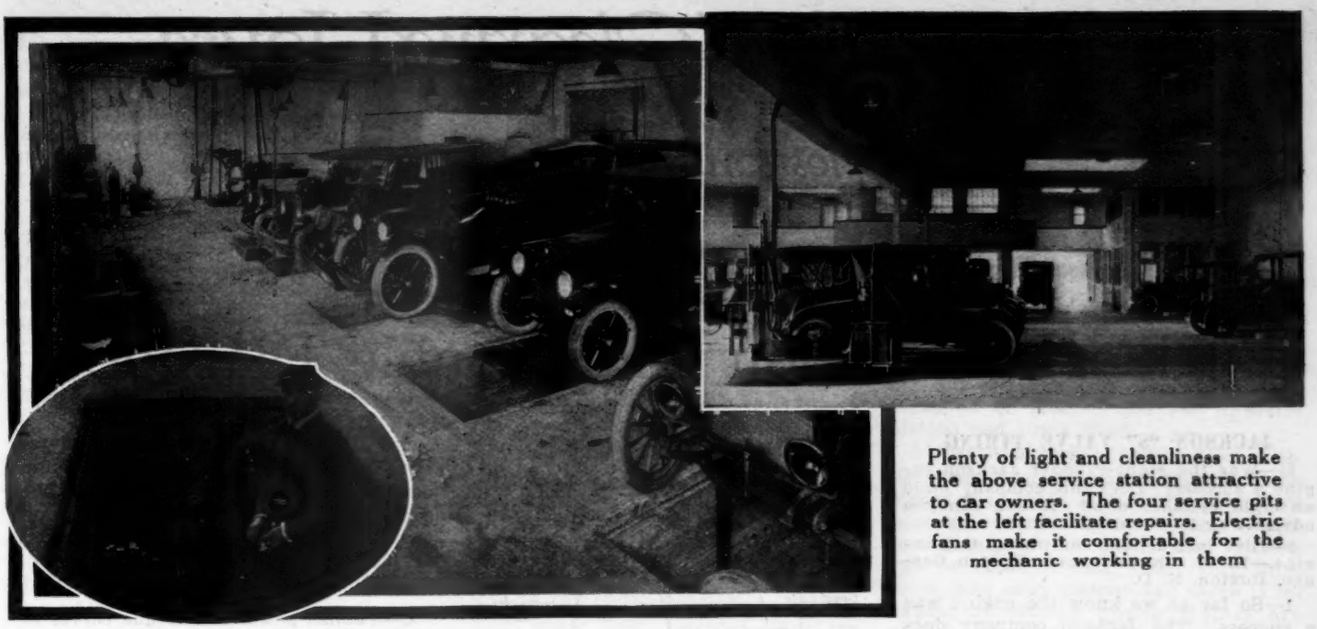
But let's return to the tile itself. We will talk about walls later. The best tile is made from a low grade fire clay that will become pretty well vitrified without warping. This sort should always be used where it comes in contact with moisture and is exposed to freezing—the two worst enemies of hollow tile. From these hard, almost non-absorbent kinds, some of which appear shiny and glazed like sewer pipe or telephone conduit, there is a continuous graduation until we get to the extremely course, brittle, almost crumbly type that is used for interior work only.

These grades are made of surface clay that will seldom stand a hard burn without melting down to a fluid mass. They are given more of baking heat than a real fire, and seldom get beyond the red stage. This, of course, makes them cheaper but they will be found to cost more in the end if they are used where weather can affect them.

Hollow tile comes in a variety of shapes and sizes, some of the more standard of which we show. There are many others made for special purposes, like floor arches and patented interlocking wall shapes, but those shown are the most common and are the ones carried by the material men for general building purposes. All the standard sizes are made 12 in. long but half length pieces are made for breaking joints and a certain per cent of these are always included by most makers in every order.

Manufacturers that make a specialty of hollow tile for residence building make many special pieces such as window sill shapes and those necessary to fit around the weight boxes of window frames, etc., but these are not usually necessary for garage work for most of the work is straight away 8 in. or 12 in. walls. Here the large 8 in. by 12 in. by 12 in. blocks will be found most economical in cost, labor, and mortar.

(To be concluded)



Plenty of light and cleanliness make the above service station attractive to car owners. The four service pits at the left facilitate repairs. Electric fans make it comfortable for the mechanic working in them

Here Are Some Good Service Features

WHILE the selling of Studebaker cars is the principal business of the Silver Motor Car Co. of Modesto, Calif., the most complete service policy has been placed into effect to back up these sales. This company has recently completed a combined salesroom, service station, repair shop and garage, which is a composite of all the best features of all the best service stations in California.

When it was originally built, only a few months ago, the owner thought he was five years ahead of the time, but the success of the service station has so far exceeded Mr. Silva's expectations that he now wishes he had built it twice as large, which only goes to show that people appreciate and will patronize an institution that gives real service.

All the large service stations in California cities were visited by Mr. Silva before starting to build. He has included all the best features found on his visit and the result is a model institution.

Repair Pits Save Time

A novel feature of the repair shop is the four large individual pits which extend the full length of a car, each pit being provided with cement steps, small work bench, stand for small vise, drawer for tools, electric light and electric fan. The fan is a great advantage in ventilating the pit and keeping the workmen cool. A traveling crane extends along the head of the pits which is capable of moving an engine or any other part from one end of the shop to the other. Extending from the beams of the shop are air lines for operating drills and grinders. These air lines extend down directly over the pit, making it convenient to grind valves of engines without the necessity of moving cars to other parts of the shop. Electric lights of 150 watts each and with reflectors are swung from beams on the front end and between each pit. This gives light on either side of the engine or top of car, and similar lights are placed at the rear of each pit. Immediately in front of the pits is a workbench which extends the entire length of the shop occupied by the pits. In front of the bench is a row of lights so arranged as to be out of the way of the workmen and not easily broken.

Conveyor for Gasoline Sales

One end of this room is equipped with the latest type of lathes, grinders, drill presses, a 50-ton press for pressing out gears and bearings, and other machines necessary to take care of all repairs. There is also complete welding equipment which can easily be moved to any part of the shop. A novel feature is the incinerator for burning up rubbish and rags. This is built in conjunction with the forge, both using a common flue. Metal ash bins are placed throughout the garage and all accumulations of rags and paper are burned twice daily. There is also a complete vulcanizing outfit.

Mechanics' dressing rooms, lavatories and lockers have been provided in the machine shop as well as a well-arranged tool room where all tools are cared for.

A time clock is installed in the machine shop, and when a mechanic starts and stops work on a job his card must be punched, eliminating waste of time on repair bills.

At the rear of the garage and in the center of the building is a gasoline service station with a five-gallon pump having a meter for registering the number of gallons. This is connected with the business office by means of a Lampum cash conveyor of the type usually found in department stores. The bill for the gasoline and oil is sent to the cashier by means of this cash conveyor, the cashier receipts the bill, makes the change and returns it to the gasoline service station by means of the cash conveyor.

A novel feature of the washing rack is the specially designed sump which eliminates the possibility of the sump hole ever becoming stopped up. The sump hole is 4 ft. square and 4 ft. deep, with a concrete wall in the center dividing it into two sections. The water and mud drops into one section, and the water rises and flows over the top of the concrete wall into the other section, leaving all mud behind which can easily be cleaned out. One-half of the grating is covered by metal to divert the water and mud into the proper section.

Ceiling Finished With Plaster

Inter-communicating telephone systems connect all departments. For the purpose of calling employees, call bells and buzzers are installed throughout the plant which are operated by push buttons located in the general office and the manager's office. A very loud bell is installed in the repair shop so that it can be heard above the noise of the machinery. A second bell is placed in the garage and buzzers in the offices.

The ceiling and roof of the garage has not been left with rafters and beams open like the average garage, but has been finished off with metal lath and plaster, which is not only a prevention against fire, but also gives a clean looking appearance. There are three skylights along the east side and two openings on the west side of the garage for smoke and gas ventilation. The entire west side of the garage building is filled with wire glass windows.

The Readers' Clearing House
Questions and Answers

CONDUCTED BY ROY E. BERG
Technical Editor, Motor Age

Engine Information and Trouble Diagnosis

JACKSON "8" VALVE TIMING

Q—Was the eight-cylinder Jackson engine a success? Does this company build an eight cylinder now? If not, can you advise why it was discontinued?

2—Give instructions for timing this engine.—H. F. Schwandt, care Buxton Garage, Buxton, N. D.

1—So far as we know the engine was a success. The Jackson company does not build an eight cylinder engine at the present time. We cannot state why the eight was discontinued but it was probably a question of policy which is always entirely up to the executives of the company.

2—A diagram of the timing of the Jackson engine is shown in Fig. 1. To time this engine it is customary to set the camshaft with reference to the opening of the intake valve of cylinder No. 1, which is the right front cylinder. By referring to the diagram you will note that this valve starts to open when the flywheel (and consequently the throws of the crankshaft) is 14 deg. past center.

Owing to the difficulty of determining accurately the degrees on the flywheel, we have marked the flywheel rim with several lines which when brought central with the top of the flywheel case indicate the following:

Dead center	1 R and 4 R
Exhaust close	1 R and 4 R
Intake open	1 R and 4 R
Dead center	1 L and 4 L
Exhaust close	1 L and 4 L
Intake open	1 L and 4 L
Exhaust open	1 R and 4 R
Dead center	2 R and 3 R
Exhaust open	1 L and 4 L
Intake close	1 R and 4 R
Dead center	2 L and 3 L
Intake close	1 L and 4 L

The cylinders on the righ hand side of the car are numbered 1 R, 2 R, 3 R, 4 R, starting from the radiator. The cylinders on the left hand side are numbered 1 L, 2 L, 3 L, 4 L, starting from the radiator.

With the foregoing information it should be a simple matter for any one to time the engine. First turn the flywheel until the pistons are in their correct positions. Without moving the flywheel, insert the camshaft and mesh the teeth of the gears so the cam will cause the push-rod to rise and start to open the intake valve on cylinder No. 1, when the flywheel is moved the least bit in the direction of rotation. By turning the pushrod with the thumb and finger as the flywheel is slowly turned, you will feel it tighten just as the valve starts to open.

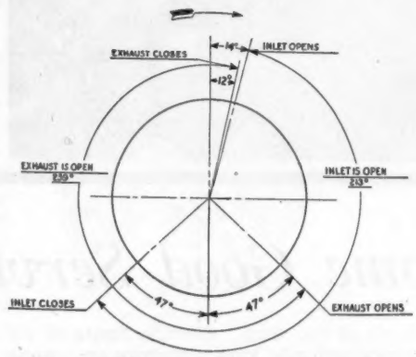


Fig. 1—Diagram giving the valve timing of the eight-cylinder Jackson engine

CAMS

Q—In the Jan. 3, 1918, issue you illustrated two types of cams and stated there is a third type known as "constant acceleration" used by high speed racing engines, but you do not show sketch. Kindly publish sketch of this third type and advise if it can be used with flat surface follower as well as with roller. Give range of r.p.m. it is designed to function.—J. R. Callum, Norfolk, Va.

The diagram showing a constant acceleration cam with a concave flank is shown in Fig. 2. The type of cam follower used is the roller or "V" type. The constant acceleration cam is so named because its outline can be made to give the valves a constant acceleration during the first part of its lift and during the first half of its closure. The same is true with deceleration being constant on the last half of the lift and during the last half of its closure.

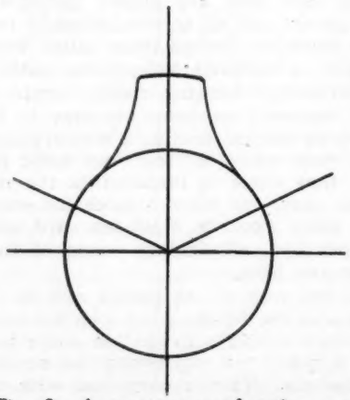


Fig. 2—A constant acceleration cam with a concave flank

POWER CURVES

Q—Publish power and torque curves of Hudson Super-Six, model O, Chandler and Haynes 47.—J. Arthur Glattly, Kokomo, Ind.

The power curve of the Hudson engine is shown in Fig. 5, of the Chandler in Fig. 6 and of the Haynes 47 in Fig. 4.

OILING SYSTEM FAILS

Q—The oil pump on both a Nash and a Studebaker does not work. Have cleaned pump and lines, still the gage shows very little pressure. Advise cause and how same can be remedied.—Sam Wilson, Lockesburg, Ark.

In cases where the model of a car is not mentioned we shall have to assume it is one of the recent models. The oiling system of the Studebaker is of the circulating splash type. Oil is drawn from the oil pan by means of a gear pump driven by an accessory shaft. From the oil pump, the oil passes through a pipe to distributer pipe fastened to the underside of the crankcase. By means of four drilled holes registering with distributer pipe holes, oil is conducted to camshaft bearings. In the bearings of the camshaft are holes through which oil passes twice every revolution of the camshaft.

When this hole in the camshaft registers with the hole in the crankcase, oil is forced through, allowing the oil to feed by gravity to the crankshaft bearings. An oil pressure gage is located on the dash which registers the back pressure on the oil pump. This gage should read from 2 to 3 when the oil is warmed up. If it shows higher than 3 it is an indication of an obstruction in the distributer pipe. If the gage does not register it indicates that the pressure system is inoperative.

First make sure that there is oil in the crankcase. If the gage fails to operate after finding that the reservoir contains oil, the joints and gaskets should be checked for tightness and the pump primed by disconnecting the gage pipe from distributer base and squirting in oil. If the gage still fails to function it would be advisable to remove it and try a new one. Since we do not know just

exactly what the gage registers in your case, it is impossible for us to state whether there is any existing trouble or not. If the oil is warmed up and is in a diluted state after running for sometime the vicosity being lower will naturally result in a lower pressure reading at the gage.

STUDEBAKER POWER CURVE

Q—Publish power curve of the 1920 Big Six Studebaker.

2—Give gas mileage and highest speed under average conditions.—J. Boren, Chicago, Ill.

1—Power curve is shown in Fig. 3.

2—This car ought to make about 60 miles an hour and should get from 12 to 15 miles per gallon of the gasoline.

ESSEX PISTON PIN

Q—Is the piston pin in the Essex offset in the piston? If so, explain the method of installing.—Fred Abel, Shannon Automobile Co., Shannon City, Iowa.

The piston pin in the Essex is not offset, therefore, it will make no difference which way it is installed.

8-CYLINDER ENGINES

Q—Will there be as many makes of eight-cylinder cars as before the war and will they be as popular?—Gerald F. Hoffman, Princeton, Ill.

This is a question that cannot very well be answered. There are more eight-cylinder cars on the American market today than there were a few years ago and there has been some recent additions. Three new eight-cylinder cars have been placed in production within the last six months. From this it appears as though the eight-cylinder type is not only holding its own but gaining a little ground. In addition to the "V" type eight-cylinder engines, two manufacturers are presenting cars with eight in line engines.

TIMING JEFFERY ENGINE

Q—Give instructions for timing a 1916 Jeffery 1½ ton truck. Give timing of ignition after the engine has been completely disassembled.—A Reader, Hanover, Ill.

The camshaft and crankshaft gears are marked, the crankshaft gear with a punch mark which should mesh between the two marked teeth of the camshaft gear. The ignition timing is as follows:

Fully retard the spark lever on the steering wheel, also make sure the breaker box is at full retard. Take off the breaker box cover. To set the magneto, turn the engine over until No. 1 piston is at upper dead center on the compression stroke. This is indicated

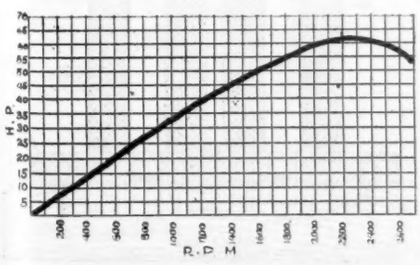


Fig. 3—Power curve of Studebaker Big Six engine

The Readers' Clearing House

THIS department is conducted to assist Dealers, Service Stations, Garagemen and their Mechanics in the solution of their repair and service problems.

In addressing this department readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been asked by someone else and these are answered by reference to previous issues. MOTOR AGE reserves the right to answer the query by personal letter or through these columns.

by the mark on the flywheel, one and four coming directly in line with the marks on the clutch housing.

With spark fully retarded, turn the magneto shaft in the direction of rotation until the platinum contacts of the breaker box are just beginning to break. Remove the distributer and see that the brass segment in the slip ring is just coming on to No. 1 brush. Hold the magneto shaft firmly in this position and set in the three bolts, fastening the universal coupling together. Replace the

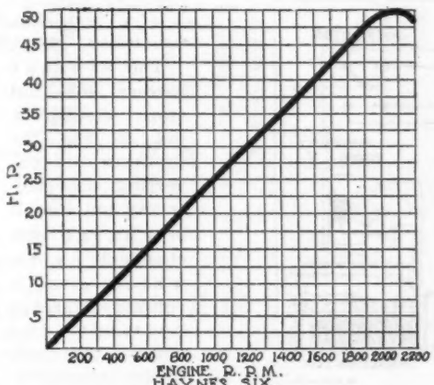


Fig. 4—Power curve of Haynes engine

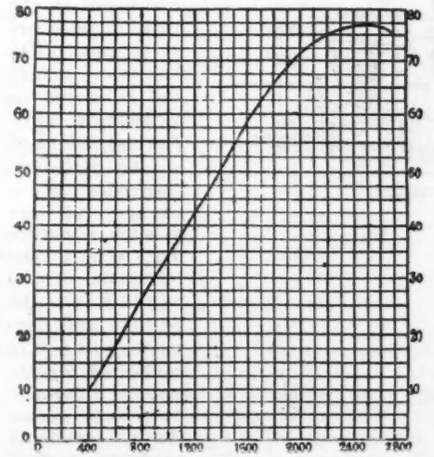


Fig. 5—Power curve of Hudson engine

cover on the magneto box and distributer. Connect the wire as marked on the carbon brushes on the magneto.

OIL PUMPING

Q—An Oldsmobile 6, model 37-A is inclined to foul spark plugs. Four miles running is enough to foul plugs. Should we regrind the crankshaft? Would it help to set the rods up more tightly?

2—Will De Luxe lightweight iron pistons help?—Bernard Rademacher, Corona, S. Dak.

1—The indications are that the pistons are pumping oil badly. In this case it is advisable to take the engine down and caliper the cylinders carefully. You will undoubtedly find that they are badly worn and out of round. The block should be reground or rebored and new oversize pistons and rings fitted.

2—Cast iron pistons can be fitted a little closer than most alloy pistons which means that there is less chance for oil pumping. As far as the success of the installation is concerned, iron pistons can be obtained that weigh very little more than alloy pistons and there is no danger of bearing trouble if they are used.

EXHAUST VALVES BURN

Q—Does the amount of oil getting to the combustion chamber have much influence on the life of valves? We know of several instances where Dodge cars with special rings installed seemed to burn up exhaust valves unduly and have wondered if the new rings could be the cause? —Joe W. Craig, Berrien Springs, Mich.

The amount of oil getting to the combustion chamber should have very little to do with the life of a valve. Under ideal conditions you would have practically no oil in the combustion chamber. In many of the engines built today which are constructed on a large production scale the cylinder blocks wear and the pistons begin to pump oil. The effect is a formation of carbon, poor seating valves and foul spark plugs. We are inclined to believe that the burning of the exhaust valves is due to the grade of material used in the valve rather than the effect of the installation of new piston rings.

ESSEX VALVE TIMING

Q—Publish diagram of an Essex valve timing.—Bob Green, Brandon, Minn.

A valve timing diagram of the Essex engine is not available but the valves are timed as follows: Intake opens 7 deg. after upper dead center and closes 42 deg. after lower dead center. The exhaust opens 55 deg. before bottom dead center and closes 8 deg. after top dead center.

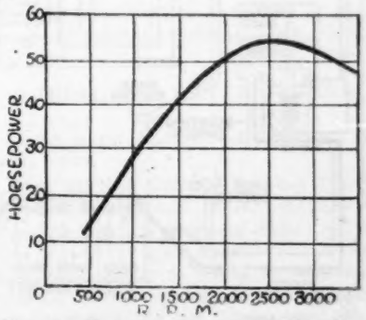


Fig. 6—Power curve of Chandler engine

ELECTRICAL SYSTEMS

SCRIPPS-BOOTH WIRING

Q—Publish wiring diagram of lighting and ignition systems of the 1918, Model H, eight-cylinder Scripps-Booth chummy roadster.

2—Give exact firing order of above car. —Harry S. Richardson, Fairview, Camden, New Jersey.

1—See Fig. 9.

2—The firing order of the engine is as follows: 1R-1L-3R-3L-4R-4L-2R-2L.

MAGNET RECHARGER

Q—Please publish plans for a 32-volt magnet recharger, 32-volt induction coil (wireless spark).

2—Can an armature tester be made if some way is used to reverse the current rapidly?—J. C. Moore, Fredonia, Penn.

1—Fig. 8 shows a cross-section of the magnet recharger. The length of the coil inside the caps should be 3 in. and the outside diameter of each coil 2⅛ in. The diameter of the magnetic core should be 1 in. Mounted on the wooden base should be a metal plate B. This plate should be of iron or steel and about ½ to ¾ in. thick. Wind the coils with No. 18 wire and approximately 1½-lb. of this will be needed on each coil. Wind one coil in a clockwise direction and the other counter clockwise.

The cores C1 and C2 should protrude from the top of the coil about an inch and over these should be fitted a cap turned from a bar of steel about 1¾ in. in diameter. There will be 734 turns per coil. The current consumption will be 8 amp. and the resistance will be 4 ohms.

BUICK WIRING DIAGRAM

Q—Publish an internal wiring diagram of the Delco single unit system used on a 1914 B-24 Buick.—Henry Goodin, Greenville, S. C.

Shown in Fig. 10.

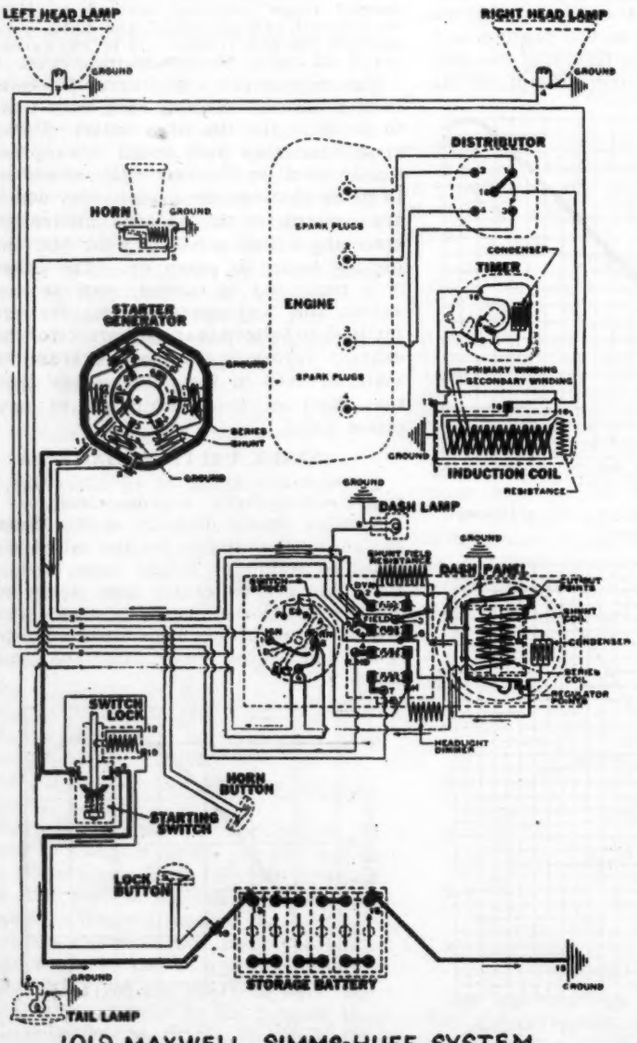
MAXWELL WIRING DIAGRAM

Q—Please publish wiring diagram of a Maxwell 1919 using a 12-volt system.

2—Can two six-volt storage batteries be used on this car in place of a 12-volt battery?—Harold R. Henry, Kewanee, Ill.

1—See Fig. 7.

2—Two 6 volt storage batteries can be connected in series and used in place of a 12 volt battery.



1919 MAXWELL SIMMS-HUFF SYSTEM
Fig. 7

THE STORAGE BATTERY

Q—Is there any electricity in the ordinary battery? —G. S. Helgeson, Osnabrook, N. D.

The storage battery does not store electricity, but it has the property of converting the electricity put into it or charge into chemical salts, which gives a voltage difference between the plates contained in the electrolyte. In other words, the energy put into a cell in the form of electricity is used up in a chemical change and is stored as a chemical only. The salts formed on the plates or electrodes of a storage cell are of such a nature that when the terminals of the plates on the positive and negative side are connected together, the difference in voltage across the cell terminals produces a flow of current which is the result of result of the decomposition of the chemical salt formed during the previous charge. A condenser is an example of a storage battery which actually stores electricity as electricity in the form of an electrical charge on the plates or electrodes. This is not the case in any commercial type of cell.

STARTING TROUBLE

Q—What might be the cause of a Dodge car not starting when a starter is used and battery testing more than 1200? Starter turns engine in fine shape but when the crank is used the engine starts right off and you don't even have to spin it.—W. G. Robertson, Diller, Nebr.

Since the engine is turned over fast enough by the starting motor and the battery is sufficiently charged there is no reason why the engine should not fire. If the engine will start readily when the crank is used there certainly must be current in the ignition circuit. It would be advisable to check the wiring carefully, the trouble is probably due to wrong wiring.

CADILLAC WIRING DIAGRAM

Q—Publish a diagram showing the connections for installing an ammeter on a 1914 Cadillac.

1—Diagram showing the connections for installing an ammeter on a 1914 Cadillac is shown in Fig. 11.

Miscellaneous

CLEANING THE RADIATOR

Q—Advise how to clean out a radiator. —E. N. Cuddy, Lafayette, Ind.

In addition to the dirt and rust that accumulates in the cooling system there is always a deposit in greater or less degree from the water used. There are two solutions that can be used for cleaning purposes but both must be used with care. If the deposit is light, first drain the system. Dissolve 1½ lb. of common washing soda in 2 gal. of water. Make enough of the solution in this proportion to completely fill the radiator. The solu-

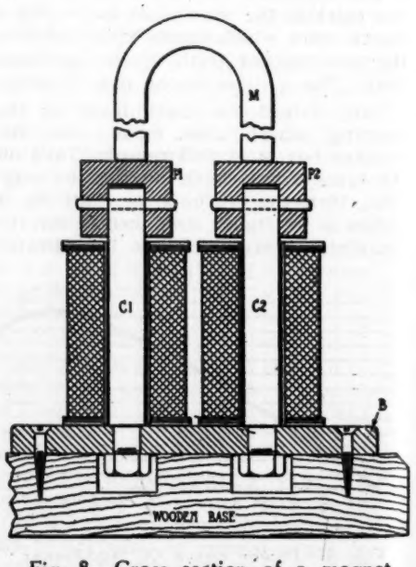


Fig. 8—Cross section of a magnet recharger

Wiring of 1916 Scripps-Booth 7-8C4—Wagner System

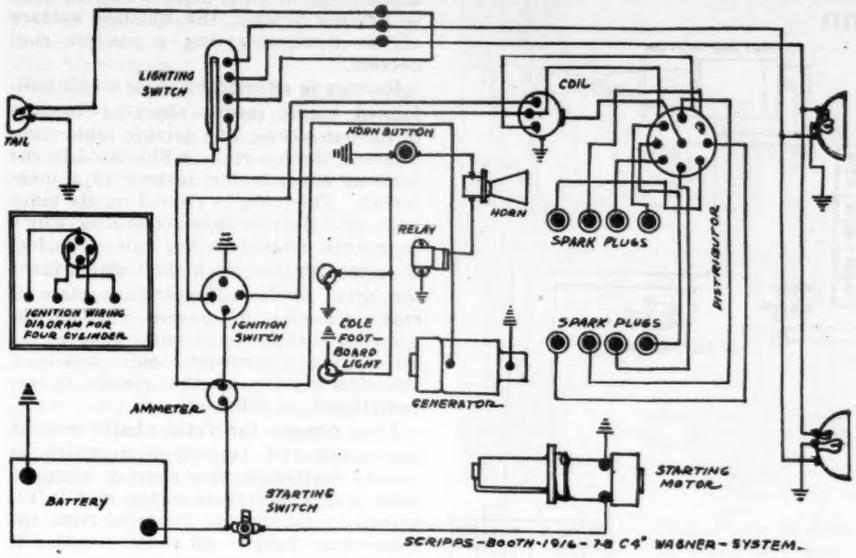


Fig. 9

Internal Wiring of Delco-Buick Single Unit System

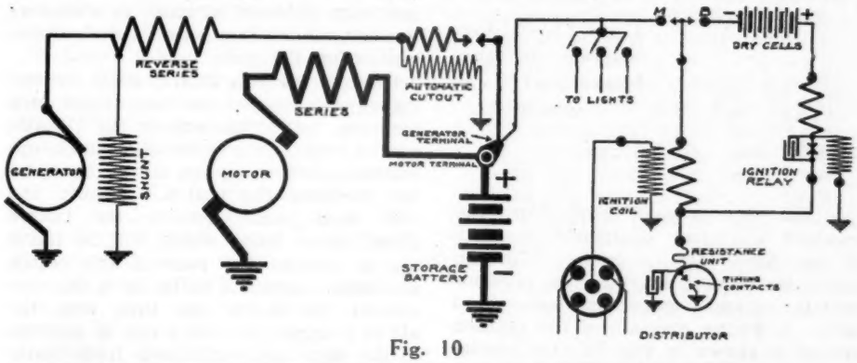


Fig. 10

Wiring of Ammeter Installation on 1914 Cadillac

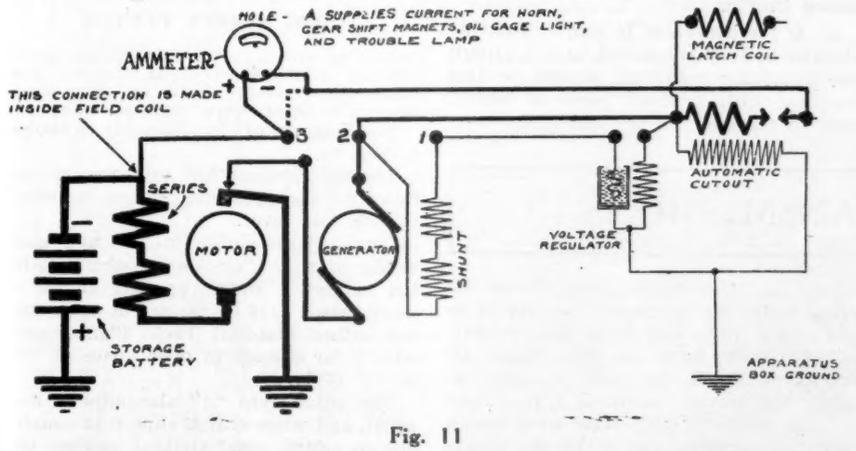


Fig. 11

tion should be used hot and, therefore, it would be a good idea to remove the fan belt to keep the solution hot while the engine is running.

If the cooling system has a pump, allow the engine to run about 10 min. If thermo-syphon run longer, about 20 min.

The solution should then be drained and the radiator filled with clear soft water. It is hardly probable that one treatment of this kind will remove the deposits completely but the same process can be repeated within a few days. In very bad cases an acid solution can be used. Make a solution of hydrochloric acid, using one part of acid to 18 parts of water. Have on hand a soda solution in proportions as given above. Pour in the acid solution and allow the engine to run as before. Drain the acid solution and fill the radiator with the soda solution. The purpose of the soda solution is to neutralize the acid. Run the engine for several minutes and drain the system. Refill the radiator with clear soft water.

INCREASING SPEED

Q—How much speed would I be able to get out of a Ford roadster if I have the engine tuned up and install oversize valves, light pistons, counter balances, Bosch magneto, Miller carbureter and a high speed camshaft? Would it pass a Paige, Buick, or a Dodge?

2—What is the speed of the average Ford roadster?—Cy Anderson, Marseilles, Ill.

1—If the work is carefully done it will be possible to get about 65 m.p.h. If the car is to be used for ordinary driving purposes it is not worth while to make these changes to get a little more speed.

2—The average Ford roadster will make about 45 to 50 m.p.h.

SOUND VOLUME

Q—What causes the unevenness in the running of a German airplane? The noise is similar to that of advancing and retarding the spark throttle.—J. W. Pollock, Woodward, Okla.

We do not believe that the condition described is present during the operation of any of the German engines. The affect of advancing and retarding the spark will cause a variation in engine speed. The increasing and decreasing of the volume of exhaust sound to which you refer is due to air currents and the relative position of the plane. If you were riding in the plane you would notice no difference in the sound, but when it is traveling and you are on the ground listening, the relative position is continually changing with the result that the sound waves reach your ear with a variation of volume.

If there is a variation in engine speed it may be due to the fuel used. The engines designed for use during the war were run on a mixture of gasoline and benzol. If the engines are now run on the low grade of gasoline there will probably be surging in the manifold and the engine will slow down and speed up. If you will take most any engine and allow it to run at a speed of say 1200 r.p.m. and set the throttle you will find that it will speed up and slow down showing considerable variation of engine speed without disturbing the throttle in any way.

REPAIRING WATER JACKET

Q—What is the best way to repair cracked water jackets?—Paul Long, Mynard, Nebr.

Most service stations make a practice of welding cracked water jackets and when the work is properly done the crack is not likely to open again. The simplicity of the repair is dependent upon the location of the crack. Both electrical and oxy-acetylene welding outfits can be used successfully by an experienced operator.

Wiring Diagram of Mack Truck—Leece-Neville System

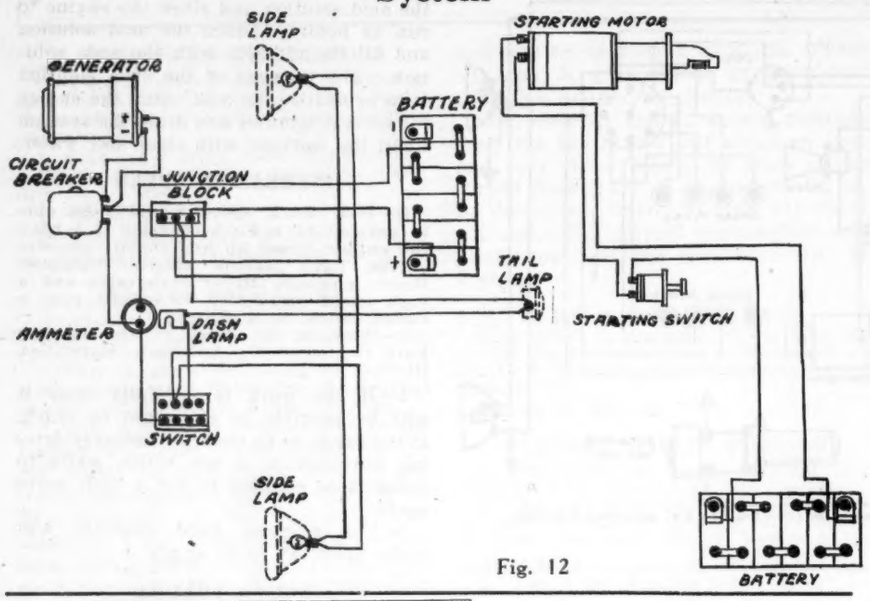


Fig. 12

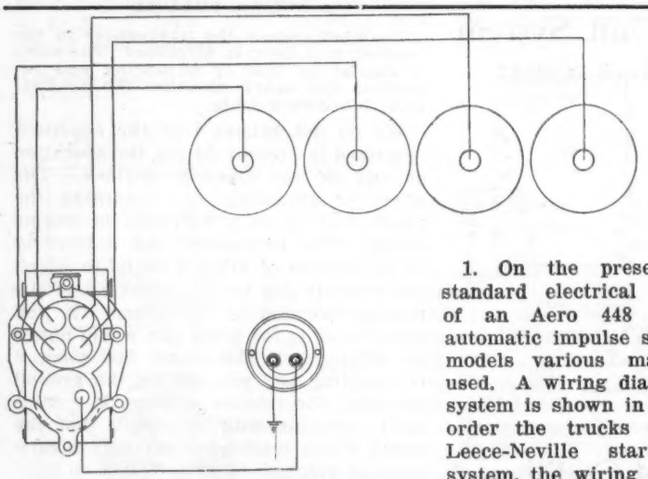


Fig. 13—Wiring diagram of the Mack ignition system

MACK ELECTRICAL SYSTEM

Q—Give complete diagram of the starting, lighting and ignition system on Mack trucks.

2—What should be done to run without the battery on the Mack trucks without doing any harm to the generator.—Mitchell D., Waterbury, Conn.

1. On the present production the standard electrical equipment consists of an Aero 448 magneto, with an automatic impulse starter. On previous models various magnetos have been used. A wiring diagram of the ignition system is shown in Fig. 13. On special order the trucks are equipped with Leece-Neville starting and lighting system, the wiring diagram of which is shown in Fig. 12.

2. If the generator is run without the storage battery connected in the circuit the generator terminals should be tied together with a short piece of copper wire to short circuit the machine.

CLUTCHES—TRANSMISSIONS

ADJUSTING MACK CLUTCH

Q—Advise how to adjust clutch on a 3½ ton Mack truck, 1920 model.

2—Explain how to disassemble the clutch.—Augusta Tire Service Co., C. Yagulle, Augusta, Ga.

1. The dimensions between the clutch brake and clutch shaft flange when there faces are parallel should be approximately ⅝ in. when the clutch is engaged. When the friction ring has worn sufficiently to increase this dimension to approximately ⅞ in. it should be adjusted as follows: Loosen the clamp bolt A and with the clutch in the engaged position turn the clutch sleeve ball bearing retainer B till this distance is correct. After adjusting, tighten the clamp A. The grease cup should be filled daily and oil should be applied to the clutch yoke and lever pins weekly.

The clutch used on the Mack AC trucks of 3½, 5, 6½ and 7½ tons capacity and on the tractors of 7, 10, 13 and 15 tons capacity is of their own design and manufacture, and is of the single dry plate type. It consists of four principle members which are integral parts of the flywheel. These are the flywheel proper, the clutch cover, bolted rigidly to it, and two plates between the cover and the flywheel. One of these plates is the driving plate and the other the pressure plate. Nine coil springs seated in the cover between it and the pressure plate force the pressure plate against the driving plate which in turn is pressed against the finished surface of the flywheel giving a positive connection.

Release is effected by three small ball-jointed toggle levers operated by the throw-out sleeve. The driving plate comprises a friction ring of Thermoid in the form of a solid ring instead of a mere facing. This ring is riveted on its inner edge to a flexible sheet steel disk which is in turn riveted to the hub. The hub is splined to the clutch shaft which turns the drive shaft. The driving plate is entirely flexible to prevent warping. It operates without lubrication, save at the self-aligning throwout ball bearings. The disassembly of the clutch is accomplished as follows:

First remove the drive shaft, between the clutch and transmission which is located amidships. This shaft is equipped with Spicer universal joints and is removed by taking out the bolts from the connecting flanges of these joints. It will be found easier to remove if the rear end is dropped first. Remove the fan belt guard. This is the perforated metal plate located on the rear of the dash covering the fan belt. Remove the fan belt. This is effected by throwing the belt off the fan pulley and then disconnecting the ends.

Remove the two clutch pedal operating caps. Remove the two clutch fork trunnion bolts. Disconnect the throttle rod at rear end and tie the clutch operating shaft so as to allow clearance for dropping the clutch. Remove the rear mud pan. Remove the twelve clutch cover bolts, which will be found spaced around the rear of the clutch assembly. Attach a ½ in. or ⅝-in. rope around the clutch and then with the aid of a helper the clutch can be lowered to the floor and withdrawn from under the side of the truck. In reassembling the clutch, exactly the same method is followed, but in the reverse order.

BORG & BECK CLUTCH

Q—The clutch on a 1918 Paige has a ringing noise when it is thrown out. Illustrate assembly used on this car.—Merritt P. Gangewere, Easton, Penn.

The diagram of this assembly is shown in Fig. 14.

The instructions for adjusting are as follows: To adjust clutch, first "release" it with foot lever.

Loosen both slot-bolts "A" and shift either of them "clockwise" about ½-in. Let in clutch, and, if opening at "B" is more than 2 7/16 in. throw out again and tap either slot-bolt back ("anti-clockwise") far enough to open space at "B" to 2 7/16 in.

The adjustment "A" also adjusts foot pedal, and when clutch slips it is usually due to clutch pedal striking against under side of foot board. When adjusting clutch see that at least ½-in. clearance is left between pedal and foot board, for wear-in.

A—Note—The clutch pedal should be set right when car leaves factory, and if the pedal hangs up on the under side of foot board, use clutch adjustment only for obtaining necessary clearance as the

single clutch adjustment automatically adjusts the pedal. When clutch is adjusted the clutch pedal automatically moves forward, giving necessary clearance for wear-in.

Should it be necessary to adjust pedal at any time set clutch at proper position first, and then set pedal according to location of clutch throw-out collar, giving proper clearances on pedal, as indicated above.

B—The adjustment "A" must be used to increase or decrease this "B" space. When clutch is "in," if space between these faces is more than 2 7/16 in. the throw-out movement will be too short for clean release.

C—When bolts "A" reach last end of cover slots, due to repeated adjustments, screw them out of their mounting holes and set them back into repeat holes exposed near first end of slots, thus doubling the range of adjustment.

D—If, for any reason, the clutch is to be taken apart, first punch remounting "line-up" marks on cover and casing, as clutch will not work properly if cover is shifted in remounting.

E—In taking the clutch apart, first throw out the same and "lock out" the spring by placing a space-block 1 15/16 in. high and 4-in. long between the cover and throw-out yoke at "E."

F—Leave asbestos ring loose in their seats. When assembling, the two asbestos rings should be coated on all sides with a thin layer of non-acid grease or cylinder oil. About every thousand miles remove adjusting screw and "squirt" a little oil into clutch, just enough to moisten asbestos mats. Too much oil will cause clutch to slip until oil is burned out.

See that incline thrust ring slides

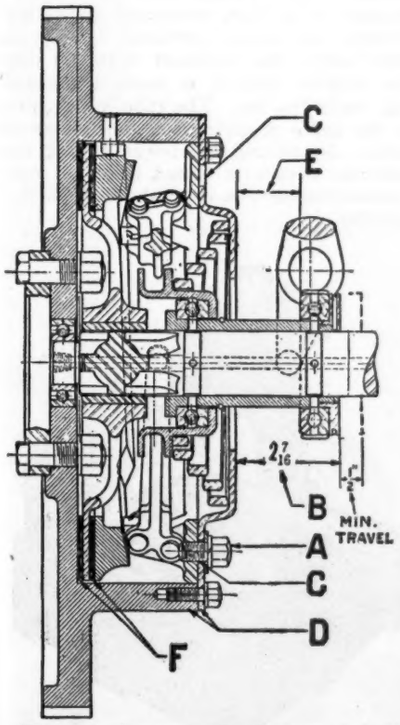


Fig. 14—Cross sectional view of the Borg & Beck clutch on the 1919 Paige

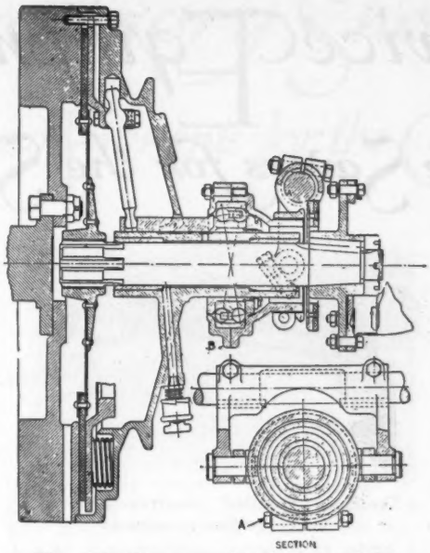


Fig. 15—Cross sectional view of the clutch used on the Mack 2½ ton truck

freely on the three drive pins in the fly-wheel.

If car is stored for any lengthy period block out clutch pedal with stick to prevent it from becoming set.

If clutch needs cleaning remove adjusting screw and pour ½-pint of kerosene into it, let motor run for one-quarter-hour, and then drain the clutch by letting car stand over night with front wheels at a higher position than rear wheels.

Do not slip clutch excessively instead of shifting gears.

Do not drive with foot on clutch pedal.

LOZIER CLUTCH

Q—What year was engine 2183 used in the Lozier car? This car had a four-cylinder engine and Bosch magneto.

2—What type of clutch was used in the above car, dry or oil disk?

3—What speed does this engine develop and what would be the best type of generator to install for lights only? At what speed would it have to turn over?

4—What clearance should the valve tappets on this engine have?—J. R. Johnston, San Francisco, Calif.

1. The Lozier car has been out of production for some time and there is very little information available. A four cylinder car was built in 1912 and 1914 and from the serial number we should judge the car is one of the 1912 models.

2. The clutch is of the multiple disk type running in oil. It consists of alternate driving disks of steel faced with an asbestos fabric and wires woven tightly together, and driven disks of saw blade steel. The driving disks have lips or ears at intervals of 90 deg. in their outer perifery and each lip is provided with a hole of sufficient diameter to fit over studs inserted in the flywheel. The rotation of the flywheel thus causes the driving disks to revolve with it.

The driven disks are keyed to a drum which is directly connected to the clutch shaft. With the clutch engaged, the driving disks are forced together by the pressure of springs acting against a pressure plate, the resulting friction being sufficient to propel the car. The clutch is released by pressure on the clutch pedal which is connected with the yoke shaft, the yoke being actuated by the pedal moves in such a way that the pressure on the driven disks is removed and they are released from the action of the driving disks. A diagram of the clutch used in 1914, which is very similar to that used in 1912, with yoke and shaft is shown in Fig. 16.

3. We do not know what speed the engine develops, but it is a slow speed engine which probably develops its maximum hp. at about 1,600 r. p. m.

We have no blueprints of this engine and so cannot furnish any suggestions as to the best way to install a generator. We advise writing to the manufacturers of the electrical equipment you wish to install, as they will be in a position to furnish suggestions for installation.

4. The valve should be set so as to have a clearance of .003 between the push rod and the valve stem. This can be accomplished by setting up the tappet adjusting screw and locking it with the lock nut just below.

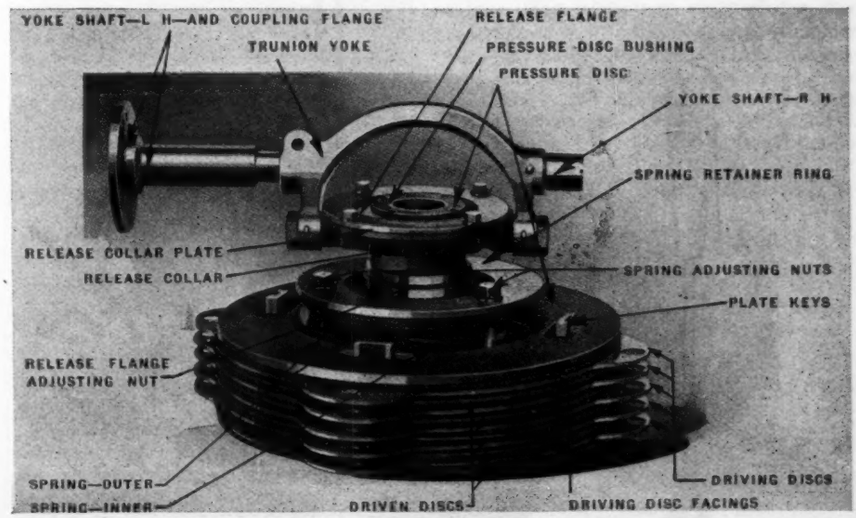


Fig. 16—Clutch used on 1914 Lozier

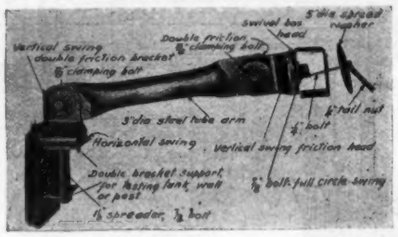
Service Equipment
Time Savers for the Shop

Mechanics' Ratchet Wrench

The body of this wrench being short and the teeth in the ratchet fine, it can be used to advantage in places where space is limited. For additional leverage an extension handle is supplied. The ratchet is reversed by turning the handle over and inserting the socket from the opposite side. Having originally been designed for connecting rod bearing work on tractors, the tool is exceptionally strong and the ratchet, dog and sockets made of high grade steel heat treated. From the illustration it will be seen that two teeth are engaged all the time in the ratchet, and as these teeth are close together a very slight movement of the handle is all that is necessary for a new bite. Hexagon sockets for S. A. E. bolts from 7/16 in. to 7/8 in. can be supplied as a set or singly as desired. Frederick Hansen Co., 417 Washington avenue, North Minneapolis.

York Cylinder Reboring Tool

Many mechanical features of superiority are claimed for the York cylinder reboring tool, one of which is the non-threaded bar. The smooth feed bar on this tool eliminates the possibility of any wear and play developing in the main bearing, according to the designers. The six cutters in the cutter head can be adjusted without removing the head from the feed bar, which permits the tool to be applied with the same ease to large and small diameter cylinders. If hand operation is not desired a power drive attachment can be obtained which will operate the tool by the aid of any make electric drill. Prices range from $162 to $225, according to the size bore desired. Manufactured by the Flinchbaugh Machine Co., York, Pa., and distributed by the Detroit Consolidated Sales Co., 2631 Woodward avenue, Detroit.


Vertical swing double friction bracket & clamping bolt
Double friction & clamping bolt
Swivel box head
5/8in spread washer
5/8in steel tube arm
Horizontal swing
Vertical swing friction head
5/8 bolt
5/8 bolt full circle swing
Double bracket support for fastening tank wall or post
1/2 spreader, 1/2 bolt

Showing detailed construction of Hardy radiator support

Hardy Radiator Support

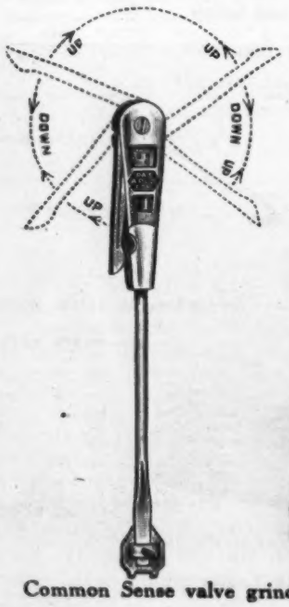
For supporting and holding automobile truck radiators while they are being repaired the Hardy Radiator & Motor Co., Little Rock, Ark., have put on the market a triple jointed steel radiator vise with a four-way swing, adjustable to all angles. Saving a floor space is one advantage of the Hardy radiator support. When it is not in use the joint bolts can be loosened and the support folded down into small space. It is made of tube steel with double friction steel discs, and said to be practically indestructible.

Common Sense Valve Grinder

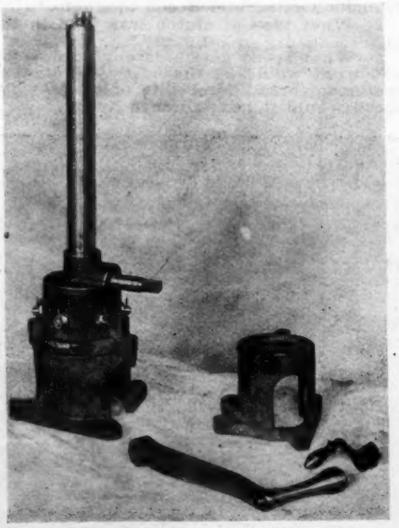
The main idea followed in designing this tool was to get the slapping effect as in using an ordinary screw driver, only in much less time. The handle is a die casting and the gears are of a special alloy. The oscillating effect is through beveled gears which have a range of from ⅛ to 2 turns of the blade to each stroke of the lever. There is an assortment of stampings which cover all valves and these stampings are attached to the blade in such a way as to act as a universal joint, leaving the valve to seat perfectly at all times, and allowing the eighth valve of the Ford to be reached under the dash. The lever folds in the handle and by removing the stamping a good screw driver is obtained. This tool retails at $3.50 by the Common Sense Mfg. Co., Hammond, Ind.

Convenient Containers for Grease

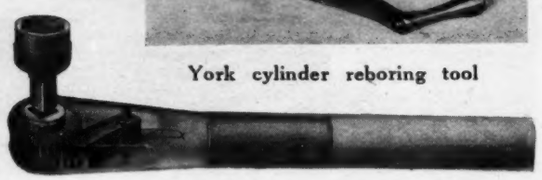
The Bassick lubricant container is a new device for the elimination of "mess" in handling lubricants. This container or can is made with a cone-shaped plunger. It is designed to fill the compressor of a high pressure lubricating system. By simply pressing down with both hands, the lubricant is forced into the cylinder until it is completely filled and ready for use. The tube is operated in the same manner as a tube of tooth paste. By rolling the lower end of the tube the grease is forced into the compressor which fits over the top of the cylinder.



Common Sense valve grinder



York cylinder reboring tool



Mechanics' ratchet wrench

Hardy radiator support in operation

The Accessory Show Case

New Fitments for the Car

Steer-Post Lock

A lock which will fit every car on the market except the Ford, Maxwell, Overland 4, and Stearns, and which has the approval of the Underwriters' Laboratories, Inc., has been placed on the market by the H-R Mfg. Co., 1926 S. Wabash avenue, Chicago. This consists of a bronze casting highly nickeled with all working parts of steel, case hardened. It is rigidly attached to the steering post of a car and when locked the steel plunger penetrates both the outer and inner steering post, making it impossible to turn the steering wheel.

Ever-Klean Seat Pad

A washable seat pad for protecting seat covers and cushions as well as wearing apparel is made by the Wedler-Shuford Co., 19th & Locust streets, St. Louis, and sells for $1.50. It consists of two pieces of 17 by 17 closely woven rice straw, bound and reinforced with a strong, non-fading material. The two pieces are sewed together, thus acting as a combination back and seat pad, as shown in the illustration. Being flexible it can be rolled into a neat bundle, and can be easily cleaned with a sponge or damp cloth. These pads also serve a very useful purpose in the service station as a protection of cushions while a car is being repaired or tested.

Weston battery tester

Miely traffic signal

The Miely Stop Signal

This is a stop signal that is automatic in its operation. It flashes stop or slow in front of the motorist following the car equipped with the signal. The device is electrically operated and in operation will record just what the car is doing. For example, a motorist is speeding along and the driver desires to stop—he shuts off the gas and when the speedometer has registered 15 m.p.h. the Miely signal automatically flashes slow. This shows until the car slows down to 5 m.p.h., at which time the signal automatically flashes stop. The driver to the rear is warned and rear end collisions are averted. When intending to turn a button on the steering wheel is pushed which flashes either to the right or left. The device is made by the Miely Manufacturing Co., East St. Louis, Ill.

Weston Heavy Discharge Battery Tester

The purpose of this instrument is to test the voltage of each cell of the battery while a relatively heavy current is flowing. It consists of a prod upon which is mounted a direct current voltmeter having a range of 3—0—2 volts. This prod has two prongs securely fastened in a wooden handle which are spaced so that they can be pressed into the cell terminals of the standard automotive batteries. Connected between the prongs is a special alloy conducting strip of approximately .01 ohm. resistance through which approximately 200 amp. will flow when 2 volts is applied across the prod. The tester Model 453 complete lists at $18 and is a product of the Western Electrical Instrument Co., Newark, N. J.

Aero-Cap

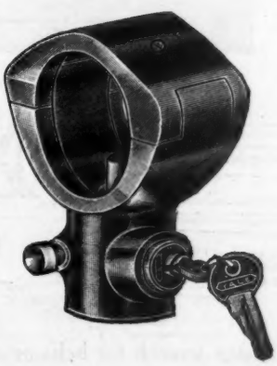
The aero cap is designed to do away with the inconvenience of handling the round radiator cap. It is made in one piece of bronze, nickeled or aluminum. The propeller on the cam makes it convenient to handle and just a slight pressure one way or the other, tightens or loosens it. The illustration shows the cap in connection with a moto meter and the cap comes drilled ready for this installation if this is desired. Manufactured by F. Wolk & Sons, Louisville, Ky. Price $5.

Ala Chargometer

This chargometer for taking specific gravity readings is made of a one-piece oval-shaped ball-balanced accurate reading hydrometer float and a one piece tapered, extra heavy glass container that will not permit the float to stick to the sides. The advantage claimed for this instrument is that the float is at all times fully exposed to the eye, clear of the bottom and will not stick to the sides of the container. The chargometer need not be taken out of the cell while a reading is being made, therefore, there is no danger of spilling acid. Price $1.25. Ala Mfg. Co., 411 to 417 S. Sangamon street, Chicago.

Left: Ala chargometer, for taking specific gravity readings

Below: H-R steer-post lock



Aero radiator cap

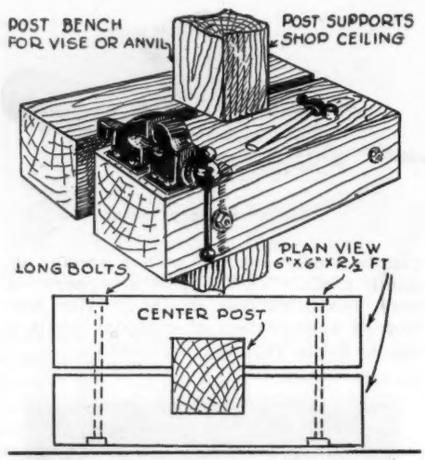
Ever-Klean seat pad

The Automotive Repair Shop

Practical Maintenance Hints

Post Bench for Vise or Anvil

A vise or small anvil near the center of the work shop is useful in that it saves many steps in walking back to the wall benches at the sides of the shop for some small task. Substantial benches suitable for a vise, anvil or for rough and heavy driving can be erected on the posts supporting the shop ceiling with very little work. Two sections of oak beams six by six or eight by eight, 2½ ft. long are squared out at the center and set in solidly against the shop posts by means of two long bolts through the center of these beams.



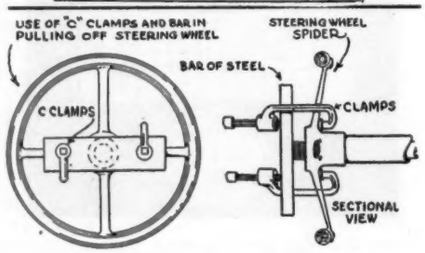
Valve Carrier

A revolving carrier for holding engine valves is illustrated on this page. This keeps the valve from becoming scratched up or dented, and is a very desirable method for handling them. The carrier can be revolved in an entire circle thus enabling the stockroom man to readily obtain any valve desired.

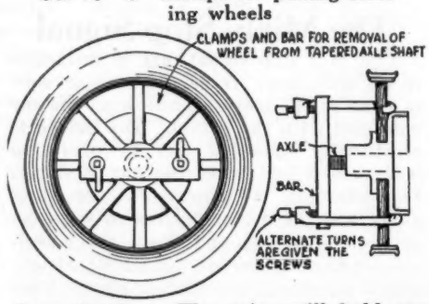
Special Clamp Wrench for Bolts or Nuts

A special quick acting clamp wrench is shown in the sketch which is useful for purposes where a bolt head is to be held fixed on the opposite side from the nut while tightening or unscrewing.

Many occasions arise for the use of a tool of this type when repairing cars without an assistant. Body bolts, fender bolts, running board bolts and dash bolts are examples of difficult bolts to work upon without a helper on the opposite side of the part to hold the bolt head while placing the nut. With this tool the head of the bolt is quickly gripped and is prevented from rotating where the end of the tool bears against some adjacent part and is prevented from turning. The grips will hold any size bolt within the limits of the jaw openings as permitted by the catch.



Use of "C" clamps for pulling steering wheels

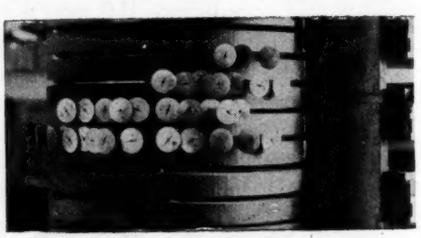


Clamp for Holding Engine Cylinder Blocks

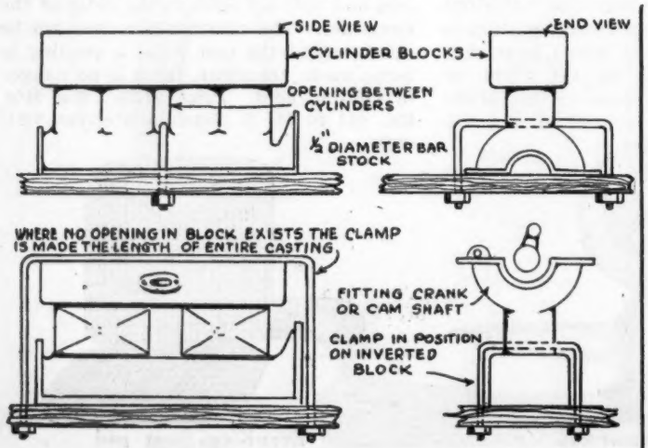
When working over an engine block placed on the bench the part is subject to shifting and moving about. The purpose of the clamps illustrated is to avoid this, holding the block rigidly while grinding valves or reaming valve guides, lapping in pistons, etc. These clamps are of bar stock, bent and threaded for nuts. The type which is used on blocks with the opening through the center is equally as serviceable for the drill press bed when pistons are lapped in from below, or for holding the block inverted on the bench when putting in crankshafts or camshaft bearings.

Use of "C" Clamps for Pulling Steering Wheels

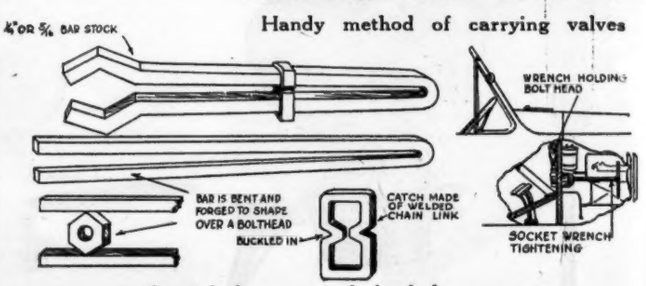
Occasionally the available gear pullers will not work on some parts of a car, or gear pullers too large or too small are the only ones at hand. A substitute for the gear puller can be made up from two "C" clamps and a steel bar arranged as shown in the drawing, and will give good service for these occasions. The bar is placed across the extended end of the shaft with the clamps set with the screws to bear against the bar. Alternately screwing down on the clamp screws, the parts can be separated without the delay incident to procuring a puller to suit the conditions. For use in pulling wheels from axle shafts where a puller to fit the hub threads is not at hand this use of the "C" clamps is more workmanlike than sledging the end of the axle and can be used without injury to the axle threads.



Handy method of carrying valves


SIDE VIEW
END VIEW
CYLINDER BLOCKS
OPENING BETWEEN CYLINDERS
½" DIAMETER BAR STOCK
WHERE NO OPENING IN BLOCK EXISTS THE CLAMP IS MADE THE LENGTH OF ENTIRE CASTING
FITTING CRANK OR CAM SHAFT
CLAMP IN POSITION ON INVERTED BLOCK

Left: Clamp for holding engine cylinder blocks


¼" OR ⅝" BAR STOCK
WRENCH HOLDING BOLT HEAD
BAR IS BENT AND FORGED TO SHAPE OVER A BOLTHEAD
BUCKLED IN
CATCH MADE OF WELDED CHAIN LINK
SOCKET WRENCH TIGHTENING

Special clamp wrench for bolts or nuts

Law in Your Business

By Wellington Gustin

Have You a Legal Difficulty?

SEEMINGLY knotty legal problems are constantly arising in the dealer's business, which even a slight knowledge of the law easily may solve. MOTOR AGE presents here the most common legal problems which confront the dealer. Mr. Gustin, a member of the Chicago bar, not only is well versed in the law relating to the dealer, but presents it in such a way as to be readily understood by the layman. In addition to his articles, Mr. Gustin will gladly answer such individual inquiries on knotty points as may be submitted to him.

Owner Refuses to Accept Repaired Generator

A generator was brought into our shop for repairs and it was necessary to order new parts with the owner's consent. After the work was completed the owner refused to accept the generator making the excuse that the expense was too great and that he could buy a new one for the same money. We still hold the generator in our possession. What shall we do to make the owner accept this property?—The Lesmeister Electric Shop, Harvey, N. D.

You may bring an action to enforce your claim for repairs. The customer is liable for that which he contracts for. We assume that you are holding the repaired generator to assert your common law lien. If you find that this lien is not sufficient you may sue for breach of contract to recover the contract price and in the absence of an agreement as to price, then for the reasonable value of your services and the parts.

Ownership of Motorcycle Transferred

We ordered parts at the request of a motorcycle owner and after receipt of same the owner asked permission to take the parts to his machine to see whether or not they would fit. In the event that the parts did fit he promised to pay immediately. On the other hand, if the parts did not fit he would return them to us. The owner took the parts but never came back after that, and sold the machine to his brother-in-law, who still has the machine in his possession and declines to pay for the parts. The machine is now stored in a back shed which is open and accessible to all passersby,

If you intended to retain possession of the repaired motorcycle in asserting your lien to enforce payment, and did not in fact intend to extend credit to the customer for future payment of your charges, then you might recover possession of the machine through an action or replevin. However, (if within the 30 days allowed) you may file a lien claim with the register of deeds and assert it against the present holder of the property.

Disposition of Abandoned Car

Some two months ago a man called us to tow a car in, and we found the connecting rod burned out and a hole in the crankcase. The fellow offered to sell the car very cheap, but we were doubtful of the ownership. He left the car in the shop, gave his address as Cleveland, Ohio, said he would forward the parts, and return for the car. The parts came to him at the Postoffice C. O. D. and were returned to the company after thirty days time. He has never appeared, neither is he known at the address he gave in Cleveland, Ohio.

We believe the car has been stolen, and want to dispose of it in some manner. We have ordered the parts on our own account, expecting to put it in shape, and dispose of it. How can we legally dispose of the car, to get our storage and expense?—Manifold's Garage, Dillonvale, Ohio.

If the car is a stolen one you do not have the legal title to dispose of it, and the true owner may take it away from you after you have ordered the new parts and made the repairs. Only the owner or his duly authorized agent may have repairs, etc. made, which one can assert against the car. However, if you have proceeded and made repairs the owner would probably be willing to pay you for your charges.

The purchaser wants a good title to the car and since you cannot give it you will have to go through legal process. This varies in the different states. In Ohio we find the statute, Sec. 14975, Page's Code of Ohio, as follows:

"That whenever any property abandoned, stolen or supposed to have been stolen, shall come into the possession of any sheriff, constable or other person, except a policeman or city marshall, and shall remain in the possession of said officer or person for a period of thirty days without being reclaimed by the owner, said property, * * * shall be disposed of as provided in said chapter in regard to estrays; if other than an animal, it shall be disposed of as provided in said chapter in regard to drifts."

Now, under the Sec. 14969, Strays and Drifts, the statute provides that where the property exceeds five dollars in value and the owner does not appear and prove his right thereto, within two months, then the possessor shall deliver it to any constable of the township, and take his receipt therefor; and the constable shall proceed to advertise, sell, and pay over the money arising therefrom to the county treasurer, who holds the proceeds for the true owner, after paying the expenses or charges of the holder in charge of the property and the fees and expenses of the sale.

Of course, if the property was not stolen you should proceed under the lien laws of your state.

Mortgaged Car Removed Without Notice

We sold a used car for part cash and the balance on terms and took a chattel mortgage on the car. The purchaser has since left without notifying us or paying the balance covered by the mortgage and took the car with him. He also ordered repair parts for a considerable amount which are still unpaid. What procedure should we take in collecting our claim?—Lesmeister Electric Shop.

Removal of a car or other personal property under the conditions you present is a criminal offense punishable by the state. Our advice would be to take this matter up through your state's attorney. If you cannot locate the party or the car, nothing can be done. If you can find him he could be brought back on warrant. Of course, your chattel mortgage is a lien on the car and the repairs made would give an additional lien, if credit were not extended for them, and if the claim of lien is filed in the office of the register of deeds within 30 days.

Freight Charges Contested

On March 11, 1920, we bought and had shipped from Little Rock, a Spacke car and one extra wheel, on which we paid a freight charge of $17.43.

We have freight bill showing this amount paid.

Now they are coming back wanting us to pay minimum on car load which will make about $27 more. Furthermore, the railroad car arrived here loaded to the roof with merchandise, some on top of the automobile, some under it and all around. The fenders and lights were bent, and the machine scratched badly. We did not turn in any claim on automobile as we knew it would be several months before we could collect, and expensive to us in the end.—Black Oak Garage, Black Oak, Ark.

Yours is a matter of local freight rate regulation, which regulations we do not have. However, we would not proceed to pay extra rates until shown the right or regulation requiring it. If suit should be brought against you to collect for this balance claimed, you may set up a counterclaim for the damages to the car in question, suffered in shipping.

Passenger Car Serial Numbers

Motor Age Maintenance Data Sheet No. 146

One of a series of weekly pages of information valuable to service men and dealers—save this page

Continued from last week

INTER STATE

Year	Model	Cyls.	Price	Serial Numbers
1912	30-32	4	$1750	4101-6000
	40-41-42	4	2400	
	50-51-52	4	3400	
1913	45	6	2750	
1914	.....	....	.....	6001-7099
1915	T	4	1000	7100-11503
1916	T	4	850	11504-14528
1917	T	4	850	14529-19108
1918	T	4	1000	19109 up
	Discontinued			Number plate under front seat

JACKSON

Year	Model	Cyls.	Price	Serial Numbers
1912	26-27-28	4	$1100	
	32—32AC			
	36	4	1650	
	42 and 45	4	1500	
	52	4	1800	
	32-Special	4	1100	
1913	33	4	1500	
	43	4	1850	
	53	6	2150	
			2300	
1914	33	4	1500	
	43	4	1850	
	53	6	2150	
			2300	Numbers do not run consecutively
1915	44	4	1135	
	48	6	1650	
1916	34	4	985	
	46	4	1375	
	348	8	1195	
	68	8	1685	
1917	34-A	4	985	
	348-A	8	1195	
	68-A	8	1685	
	349	8	1295	
	350	8	1195	
1918	349	8	1495	
			2195	Number plate on dash or on front seat heel board

JEFFERY

Year	Model	Cyls.	Price	Serial Numbers
1913	42 H. P.	4	$1700	31551-35999
1914	38	4	1550	40000-46999
	48	6	2250	38000-38999
1915	Six	6	1650	47000-53999
1916	4-62	4	1000	57000-60500
	6	6	1350	68000-69500
1917	472	4	1095	61000-78000
	671	6	1465	86000-96000
For later models see Nash				Number to left of front frame cross member

JONES

Year	Model	Cyls.	Price	Serial Numbers
1915	1915	6	.....	1-1999
1916	1916	6	.....	2000-2999
1917	26-A	6	.....	
	26-B	6	.....	3000-5000
1918	27-A	6	.....	
	27-B	6	.....	5001-6000
	27-C	6	.....	
	29-D	6	.....	
1919-20	27-A	6	.....	
	27-B	6	.....	
	27-C	6	.....	6001 up
	27-D	6	.....	
	27-E	6	.....	
				Number under the hood, on right side of cowl board, and stamped on ends of both front spring hangers

JORDAN

Year	Model	Cyls.	Price	Serial Numbers
1917	60	6	$1650	151-2157
1918	60	6	1995	2157-5298
1919	F	6	2775	5401 up
1920	M	6	2450	10001 up

KING

Year	Model	Cyls.	Price	Serial Numbers
1912	36	4	$1565	100-550
1913	A	4	1350	600-999
1914	B	4	1095	1000-2200
1915	C	4	1150	2201-3005
	D	8	1350	
1916	D	8	1350	4000-8000
	E	8	1585	12000-14950
1917	EE 1st. Ser.	8	1650	16000-17800
	EE 2d Ser.	8	1650	18000-18099
1918	F	8	2150	20001-25000
1919	G	8	2350	30001-30629, 32976, 36378, 35022
1920	H	8	.....	H-1, H-2001, H-4001 and H-5001 up
				Numbers on dash plate, except 1915 models, which are on heel board under front seat

KISSEL KAR

Year	Model	Cyls.	Price	Serial Numbers
1912	30	4	$1500	3001-4000
	40	4	1850	7001-7400
	50	4	2350	6001-6300
1913	L D 13	4	1700	10500 ———
	H 13	4	2000	7401-10000
	D 13	4	2500	6301-7000
1914	40	4	1850	15001-15601
	48	6	2350	20001-30000
	60	6	3150	4601-6000
1915	4-36	4	1450	16001-16575
	6-42	6	1850	25001-25455
1916	32-4	4	1050	30001-33001
	36-4	4	1250	16576-20000
	42-6	6	1485	25456 ———
1917	100 pt. 6	6	1195	38-101up
	Double 6	12	2250	12-101 up
1918	100 pt. 6	6	1495	
	Double 6	12	2250	
1919	Cus. Bld.	6	2875	45-101 up
	Cus. Bld.	6	2450	
1920	Cus. Bld.	6	2975	
				Number plate on dash under hood. On models built since 1915 car number stamped on front end right frame member adjacent to right head lamp. Engine number on right front motor arm

KLINE

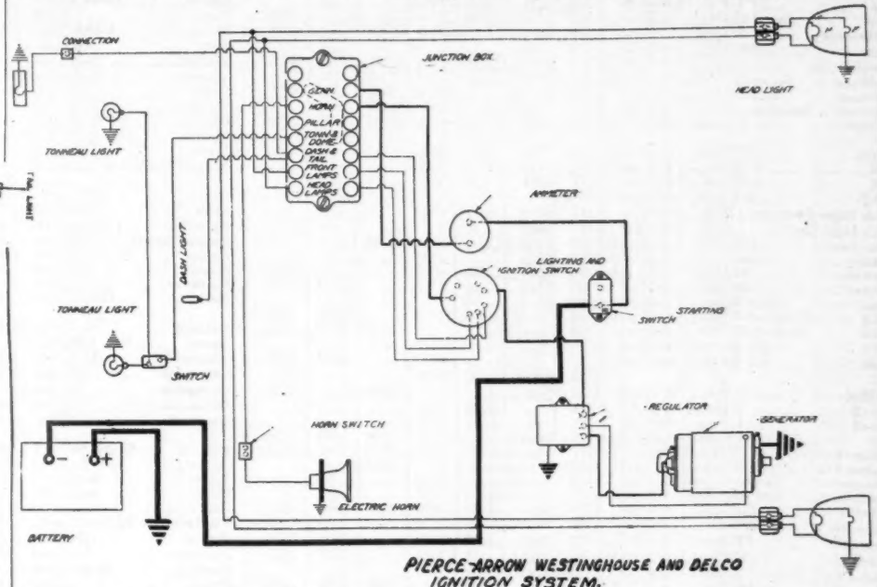
Year	Model	Cyls.	Price	Serial Numbers
1915	6-42A	6	$1750	2100-2500
1916	6-36E	6	1095	3000-3599
1917	6-38F	6	1295	3600-4500
	6-38G	6	1395	4600-4999
1918	6-38GA	6	1495	5000-5800
1919	6-42	6	1865	6000-7000
1919-20	6-55-J	6	1965	7000 up
				Number plate on right front seat floor board

LENOX

Year	Model	Cyls.	Price	Serial Numbers
1912	AB BB			
	CB DB	4	$1800	100-215
1913	AC DC	4	2000	1000-2000
	MC	6	2750	15-1525
1914	A D	4	2000	2000-2015
	M	6	2465	1525-1550
1915	A1 D1	4	2000	2015
	M1	6	2465	1551-1563
1916	O	6	2500	2500
1917	O	6	2510	2530
1918	Ser 33	6	2550	2554

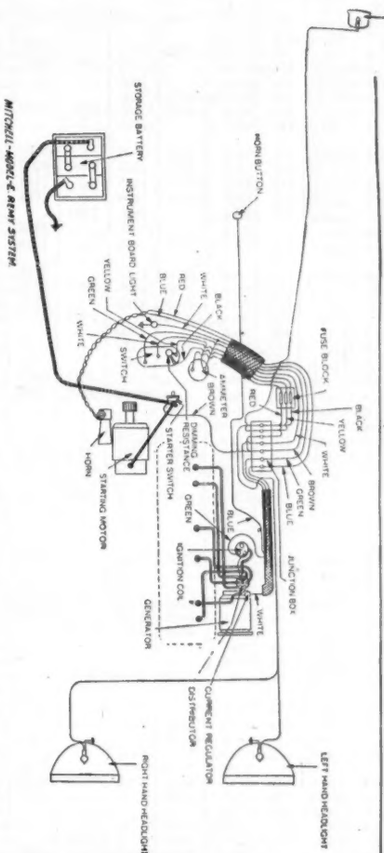
Motor Age Weekly Wiring Chart No. 124

1920 Pierce-Arrow-Westinghouse and Delco System

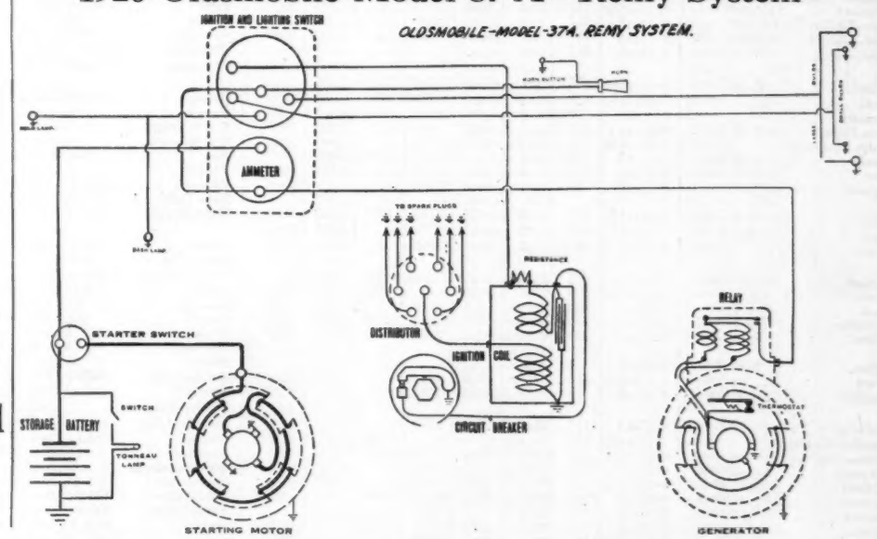


PIERCE-ARROW WESTINGHOUSE AND DELCO IGNITION SYSTEM.

1920 Mitchell--Model E—Remy System



1920 Oldsmobile Model 37-A—Remy System



Name of Car and Date on Which Wiring Diagrams Have Appeared in Previous Issues

Allen—Sept. 30, '20
American Beauty—Feb. 17, '21
Buick—Dec. 23, '20
Cadillac—Nov. 18, '20
Case—Oct. 7, '20; Feb. 17, '21
Chalmers—Feb. 24, '21
Cleveland—Feb. 24, '21
Cole—Dec. 9, '20
Jan. 6, '21; Jan. 20, '21
Daniels—Feb. 17, '21
Dorris—Dec. 9, '20;
Feb. 24, '21
Elcar—Oct. 28, '20
Dec. 2, '20
Elgin—Oct. 14, '20
Elkhart—March 3, '20
Franklin—Dec. 2, '20
Gardner—Apr. 14, '21
Grant—Nov. 25, '20; March 31, '21
Hudson—Jan. 13, '21
March 17, '21
Hupmobile—Feb. 3, '21
Apr. 14, '21
Jackson—March 17, '21
Jordan—March 10, '21
King—March 3, '21
Kissel—Oct. 21, '20
Klinekar—Apr. 14, '21
Lexington—Dec. 16, '20
McFarland—March 24, '21
Mercer—March 24, '21
Mitchell—Jan. 6, '21
Moore—Nov. 11, '20
Moline-Knight—Nov. 4, '20
Monitor—March 31, '21
National—Dec. 16, '20
March 10, '21
Oakland—March 24, '21
Oldsmobile—Sept. 16, '20
Nov. 25, '20
Dec. 23, '20
Packard—Oct. 7, '20
March 31, '21
Paige—March 10, '21
Peerless—Nov. 18, '20
March 3, '21
Premier—Feb. 10, '21
Reo—Feb. 10, '21
Roamer—Dec. 30, '20
Feb. 10, '21
Saxon—Oct. 21, '20
Dec. 30, '20
Scripps-Booth—Feb. 3, '21
Sheridan—Feb. 3, '21
Stearns—Nov. 4, '20
Jan. 13, '21
Stephens—Sept. 16, '20
Studebaker—Oct. 29, '20
Velie—Jan. 20, '21
Willys-Knight—Oct. 14, '20

Additional Wiring Diagrams May Be Found in the Readers' Clearing House in This Issue

Specifications of Current Passenger Car Models

NAME AND MODEL	Engine Make	Cylinders: Bore and Stroke	WB	Tires	2-Pass-	5-Pass.	7-Pass.	Coupe	Sedan
Ace G	Guy	6-3¼x5	123	32x4	$2975	$2975	....	$3680	$3680
Ace H	H-S	6-3⅝x5	123	32x4	2975	2975	....	3680	3680
Ace L	H-S	6-3¼x5	116	32x4	2260	2260	....	....	....
Allen Series 43	Own	4-3½x5	110	32x4	‡1395	1395	....	....	2395
Ambassador R	Cont.	12-2⅞x5	136	32x4½	....	†4500	4500	....	6500
Amco 1921	H-S	4-3½x5	114	31x4	....	....	....	....	....
American Six C	H-S	6-3¼x5	127	32x4	2395	2395	$2475	3295	3495
Anderson Series 40	Cont.	6-3¼x4½	120	33x4	2195	1795	1845	2795	2795
Apperson 8-21-S	Own	8-3¼x5	130	34x4½	....	†3500	3500	4500	4500
Apperson Anniversary	Own	8-3¼x5	130	34x4½	....	†4250	4250	....	....
Auburn 6-39	Cont.	6-3¼x4½	120	33x4	1745	1695	†1695	2795	2795
Beggs 20T	Cont.	6-3¼x4½	120	33x4	1885	1885	....	2785	2885
Bell 4-32	H-S	4-3½x5	114	31x4	....	1495	....	....	....
Bell 6-50	H-S	6-3¼x5	124	32x4	....	1695	....	....	....
Biddle B-1	Buda	3-3¾x5½	121	....	....	....	....	....	....
Birch Super-Four	H-S	4-3½x5	117	33x4	....	....	....	....	....
Birch Light Six	H-S	6-3¼x5	117	33x4	....	....	....	....	....
Bour-Davis 21S	Cont.	6-3½x5¼	126	33x4½	†2585	....	2585	....	....
Bradley Four	....	4-3½x5	116	33x4	....	1265	....	....	....
Brewster 91	Own	4-4 x5½	125	32x4½	†7900	9000	....	....	10500
Briscoe 4-34	Own	4-3⅜x5	109	31x4	1285	1285	....	1885	1885
Brook S-21 A	Own	2-3½x3⅝	90	28x3	395	....	....	....	....
Buick 21-41-5-6-7	Own	6-3⅜x4½	118	33x4§	1795	1795	....	2585	2895
Buick 21-48-9-50	Own	6-3⅜x4½	124	34x4½	....	....	2065	2985	3295
Bush E C 4	Lyc	4-3½x5	....	....	....	1245	....	....	....
Bush E C 6	Rut	6-3½x5	....	....	....	1575	....	2050	2150
			125	34x4½	3790	†3790	....	....	4950
Cadillac 59	Own	8-3½x5½	132	35x5	....	....	3940	....	5190
Carroll 6	Dues	6-3½x5	128	....	3985	3985	....	....	....
Carroll 6	Dues	6-3½x5	128	....	3185	3185	....	....	....
Case V	Cont.	6-3½x5¼	126	34x4½	....	†2650	2650	3400	3750
Chalmers 6-30	Own	6-3¼x4½	117	32x4	1795	1795	1945	2595	2745
Chalmers 6-30	Own	6-3¼x4½	122	33x4½	....	....	1945	....	....
Champion Tourist	Lycom	4-3½x5	113	32x3½	....	1250	....	....	....
Champion Special	H-S	4-3½x5	118	32x4	†1595	1595	....	....	....
Chandler Six	Own	6-3½x5	123	33x4	1930	†2010	1930	2930	2030
Chevrolet 490	Own	4-3⅛x4	102	30x3½	795	820	....	1325	1375
Chevrolet FB	Own	4-3⅛x5¼	110	33x4	1320	1345	....	2075	2075
Cleveland 40	Own	6-3 x4½	112	32x4	1465	1465	....	2375	2475
Climber Six S	H-S	6-3¼x5	125½	32x4½	2750	2750	....	....	....
Cole 870	Nort	8-3½x4½	127	33x5	3250	†3250	3250	4250	4450
Columbia D-C &CS	Cont.	6-3¼x4½	115	32x4	1945	1795	1995	2895	2895
Comet C-53	Cont.	6-3½x5¼	125	33x4½	....	2350	2450	....	3650
Commonwealth 44	H-S	4-3½x5	117	32x4	....	1595	....	....	2465
Crawford 21-6-40	Cont.	6-3½x5¼	122½	32x4	3000	3000	....	....	4500
Crow-Elkhart L63-65	Lyc	4-3½x5	117	32x3½	†1295	1295	....	....	....
Crow-Elkhart S63-65	H-S	6-3¼x5	117	33x4	‡1545	1545	....	....	2395
Cunningham V-4	Own	8-3⅜x5	132	35x5	....	....	....	....	....
Daniels D-19	Own	8-3½x5½	132	34x4½	‡5350	†5350	5350	6250	6950
Davis 51-57	Cont.	6-3¼x4½	120	33x4	†1995	1895	†2150	2795	2795
Dispatch	....	4-3½x5	120	34x4	1290	1350	1350	1525	1575
Dixie Flyer H-S-70	H-S	4-3½x5	112	32x4	1595	1595	....	2570	2570
Dodge Brothers	Own	4-3⅞x4½	114	32x3½	1235	1285	....	1900	2150
Dorris 6-80	Own	6-4 x5	132	33x5	....	†4785	4785	5800	6690
Dort 17-A	D-Ly	4-3½x5	108	31x4	1215	1215	....	1865	1995
Dupont A	Own	4-3⅛x5½	124	32x4½	3400	†3400	....	....	4900
Elcar 7-R	Cont.	6-3¼x4½	117	33x4	‡1795	1795	†1795	2500	2600
Elgin K-1	Falls	6-3½x4¼	118	33x4	†1895	1775	....	2795	2795
Essex	Own	4-3⅜x5	108½	32x4	1595	1595	....	2100	2450
Fergus S-5-21	Own	3½x5	126	32x4½	....	Chassis Price		8500	
Ferris	Cont.	6-3½x5¼	130	32x4½	3350	....	*3350	....	4100
Ford T	Own	4-3⅜x4	100	30x3½	395	440	....	745	795
Franklin 9-B	Own	6-3¼x4	115	32x4	2700	2800	†2750	2950	3850
Friend Four	Own	4-3¼x4½	112	32x3½	1285	1285	....	1985	2085
Globe B-10	Supre	4-3⅜x5	115	32x4	....	....	....	....	....
Grant Six	Own	6-3⅛x4½	116	32x4	1550	1550	....	2450	2450
Gardner G	Lyc	4-3½x5	112	32x3½	‡1195	1195	....	....	2145
Halladay 21	Rut	6-3½x5	116	33x4	....	2285	....	....	....
Handley-Knight	Kn'ht	4-4½x4½	125	32x4½	....	....	2985	....	4185
Hanson Six 60	Cont.	6-3¼x4½	121	32x4	2185	2185	†2285	....	3165
Harroun A-A-2	Own	3½x5½	106	30x3½	....	1195	....	....	....
Hatfield A-42	H-S	4-3½x5	115	32x4	1695	1695	....	....	2595
Haynes 47	Own	6-3½x5	132	34x4½	3500	†2935	2935	....	4250
Haynes 50	Own	6-3½x5	121	33x4	....	1985	....	....	....
Haynes 48	Own	12-2⅞x5	132	34x4½	4200	†3635	3635	....	4950
Huffman R	Cont.	6-3¼x4½	120	32x4	1795	1795	....	....	2775
H.C.S Series 3	Weid.	4-3⅜x5½	120	32x4½	2925	†2975	....	3650	....
Holmes Series 4	Own	6-3½x4½	126	34x4½	†3350	....	3350	4250	4550
Hudson Super 6	Own	6-3½x5	126	34x4½	†2400	.3625	3000	3275	3400
Hupmobile Series R	Own	4-3¼x5½	112	32x4	1685	1685	....	2725	2800
Jackson 638	Cont.	6-3¼x4½	121	32x4½	†2685	1950	....	3760	3760
Jordan M	Cont.	6-3¼x4½	120	32x4	2650	2650	2875	3700	3700
Kelsey GF	Own	6-3⅛x4¼	116	32x4	1800	1800	....	2700	2700
Kenworthy 8-90	Own	8-3 x5½	130	32x4½	5000	5000	5250	6000	6000
Kessler K	Own	4-3⅜x3⅜	117	32x4	....	1995	....	....	2445
King H	Own	8-3 x5	120	32x4½	2740	†2725	*2725	....	4035
Kissel 45	Own	6-3⅞x5½	124	32x4½	3475	†3475	2775	4275	4275
Kline Kar 6-55-K	Cont.	6-3¼x4½	121	33x4	2290	2290	2290	3250	3200
LaFayette 134	Own	8-3½x5½	132	33x5	....	5625	5625	7200	7400
Leach 21-A-B &C	Cont.	6-3½x5½	128	32x4½	‡5700	5200	5700	....	....
Lexington Series S	Cont.	6-3¼x4½	122	32x4	†2285	2285	....	3250	2785
Lexington Series T	Anst	6-3¼x4½	128	32x4½	....	....	2985	4150	4250
Liberty 10-C	Owned	6-3½x5	117	32x4	1795	1795	†1885	2825	2850
Lincoln	Own	8-3⅜x5	130	33x5	4600	4600	4600	5750	6000
Locomobile	Own	6-4½x5½	142	35x5	....	†8600	8600	....	....
Lone Star	Lyc	4	....	....	....	....	....	....	....
Lorraine 21-T	H-S	4-3½x5	114	32x4	1665	1665	....	2590	2590
Maibohm B	Own	6-1⅝x4¼	116	32x4	‡1575	1575	†1750	2395	2395
Marmon 34	Own	6-3⅜x5½	136	32x4½	5300	†5000	5000	6150	6600
Maxwell 25	Own	4-3⅝x4½	109	30x3½	995	995	....	1595	1695
McFarlan 1921	Own	6-4½x6	140	33x5	6300	†6300	6300	7500	7500
Mercer Series 5	Own	4-3¾x6¾	132	32x4½	4500	†4500	*4500	5700	6200
Merit	Cont.	6-3 1/16x4½	119	32x4	2245	†2245	....	....	....
Meteor R&RR	Dues.	4-4½x6	129	32x4½	5500	5500	....	....	....
Metz M6	Rut.	6-3½x5	120	32x4	1995	1995	....	2795	2895
Mitchell F-40	Own	6-3¼x5	120	33x4	‡1750	1750	†1950	2800	2900
Mitchell F-42	Own	6-3½x5	127	34x4½	....	....	1995	....	....
Moller A	Own	4-2⅞x4	100	27x3½	2000	....	....	....	....
Monitor B50-52	Cont.	6-3½x4½	121	33x4	....	....	....	....	....
Monroe S-9 & 10	Own	4-3¼x4½	115	32x3½	1440	1440	....	....	....
Monroe S-11 & 12	Own	4-3¼x4½	115	33x4	....	....	....	2400	2500
Moon 6-48	Cont.	6-3¼x4½	122	32x4	2285	2185	2685	3185	3185
Murray-Mac Six	Own	6-3½x5¼	128	34x4½	4250	4250	4250	....	....
Nash 681-7	Own	6-3¼x5	121	33x4	1695	1695	†1850	2650	2895
Nash 682	Own	6-3¼x5	127	34x4½	....	....	1875	....	....
Nash Four 41-4	Own	4-3¼x5	112	32x3½	1395	1395	....	1985	2185
National Sextet BB	Own	6-3½x5¼	130	32x4½	3750	†3750	3750	4900	4950
Nelson D	Own	4-3½x4¾	104	32x4	....	1900	....	....	....
Noma 1C	Cont.	6-3¼x4½	128	32x4½	3000	3200	....	....	4450
Northway	Own	6-3½x5¼	128	33x5	4200	*4200	6000	5600	5400
Norwalk 430-KS	Lyc	4-3½x5	116	32x3½	....	1285	....	....	....
Oakland 34-C	Own	6-2½x4¾	115	32x4	1395	1395	....	2065	2065
Ogren 6-60	Own	6-3½x5¼	134	33x5	3850	3500	3900	5000	5400
Oldsmobile 43-A	Own	4-3½x5¼	115	32x4	†1445	1445	....	2145	2145
Oldsmobile 37A	Own	6-2½x4¾	112	32x4	†1450	1450	....	2145	2145
Oldsmobile 46	Own	8-2⅞x4¾	122	33x4½	....	†2100	2100	....	3300
Oldsmobile 47	Own	8-2⅞x4½	....	32x4	....	†1695	....	2395	2395
Overland 4	Own	4-3⅜x4	100	30x3½	895	895	....	1425	1475
Packard Single-Six	Own	6-3⅜x4½	116	33x4½	2975	2975	....	4150	4250
Packard Twin Six	Own	12-3 x5	136	35x5	6000	*6000	6000	8200	8450
Paige 6-42	Own	6-3½x5	119	32x4	1795	1795	....	2600	2720
Paige 6-66	Cont.	6-3⅜x5	131	33x4½	†2995	....	2895	3775	3850
Pan A	Own	4-3¼x5	108	33x4	....	1500	....	....	....
Pan American E&F-6-55	H-S	6-3½x5	121	33x4	2250	2250	....	....	....
Parenti 1921	Own	8-2¾x4½	125	32x4	....	2000	....	....	3000
Paterson 650	Cont.	6-3½x4½	120	33x4	....	1895	1925	2895	2895
Peerless 56-S-7	Own	8-3½x5	125	34x4½	....	†2990	2990	3680	3950
Peters	Own	2-3½x3⅝	90	28x3	385	....	....	....	....
Piedmont 4-30	Lyc	4-3½x5	116	32x3½	....	1395	....	....	....
Piedmont 6-40	Cont.	6-3¼x4½	122	32x4	....	1795	....	....	....
Pierce-Arrow	Own	6-4 x5½	138	35x5	8000	†7500	7500	8500	9000
Pilot 6-50	H-S	6-3¼x5	126	32x4½	2285	2285	2335	3600	3600
Porter 40	Own	4-4 6x6¾	142	35x5	6750	Chassis Price			
Premier 6-D	Own	6-3⅝x5½	126¾	33x5	4600	†4600	4600	5600	6100
Premocar 6-40 A	Falls	6-3⅛x4¼	117	32x3½	....	1295	....	....	....
Premocar 4-80	Dues	4-4 x6	117	32x4½	....	3865	....	....	....
Raleigh A-6-60	H-S	6-3¼x5	122	32x4½	‡2750	2750	....	3600	3700
Ranger A-20	Own	4-3⅜x5	116	32x4	....	....	....	....	....
R & V Knight R	Own	4-3⅜x5	116	32x4	....	2150	....	2850	2950
R & V Knight J	Own	6-3½x4½	127	32x4½	3350	†3350	3350	4000	4200
Reo T-6	Own	6-3⅞x5	120	33x4	1850	1850	....	2700	2750
Revere C	Dues	4-3½x6	131	32x4½	4850	4650	†4650	....	6500
Roamer 6-54-E	Cont.	6-3½x5¼	130	32x4½	....	....	....	....	....
Rock Falls 14000	Cont.	6-3½x5¼	136	35x5	....	....	....	....	....
Rolls-Royce	Own	6-4½x4¾	143½	33x5	11,500	Chassis Price		....	....
Saxon 125	Own	4-3⅜x5	112	32x4	....	1675	....	2475	2475
Sayers Six DP	Cont.	6-3¼x4½	118	33x4	2495	2195	....	....	3295
Scripps-Booth B-39-42	Nort.	6-2½x4¾	115	32x4	‡1545	1545	....	2215	2295
Seneca L & O	LeR	4-3½x4½	108	30x3½	1185	1185	....	....	....
Severin Six	Cont.	6	....	33x4	1485	1485	....	2100	2250
Severin Six	Cont.	6-3½x5¼	122	33x5	2550	2550	2550	3250	3350
Sheridan 4	Nort.	4-3⅛x5¼	116	33x4	1685	1685	....	2565	2765
Sheridan 8	Nort.	8-3½x4½	132	33x5	....	....	....	....	....
Skelton 35	Lyc	4-3½x5	112	32x3½	1295	1295	....	....	....
Southern Six 660-2	H-S	3¼x5	127	32x4½	2875	2875	2995	....	....
Standard J	Own	8-3¼x5	127	34x3½	3400	†3400	3400	4500	4500
Stanley Steamer	Own	2-4 x5	130	34x4½	....	3950	3950	5650	5775
Stanwood Six	Cont.	6-3¼x4½	118	33x4	‡2050	2050	....	2950	....
Stearns SKL4	Own	4-3⅜x5⅝	125	34x4½	2550	2450	2675	3400	3700
Stephens 90	Own	6-3¼x4½	122	33x4½	2400	†2400	2400	3400	3400
Stevens Duryea E	Own	6-4⅞x5½	138	35x5	8500	†8000	8000	9500	9500
Studebaker EJ-40	Own	6-3½x4½	112	32x4	©1650	1485	....	....	2150
Studebaker EH-50	Own	6-3½x5	119	32x4	1750	1750	†1750	2650	2750
Studebaker EG-60	Own	6-3⅞x5	126	33x4½	....	....	2150	....	....
Stutz H & K	Own	4-3½x6	130	32x4½	3900	†4000	*4000	5500	....
Templar A-445	Own	4-3⅜x5½	118	32x4	2885	2885	†2885	3785	3785
Texan A-38	Lyc	4-3½x5	115	33x4	1495	1495	....	....	....
Texan C-12	H-S	4-3½x5	115	33x4	1650	1650	....	....	....
Tulsa E-1-2-3	H-S	4-3½x5	117½	33x4	1385	1385	....	....	....
Velie 48	Cont.	6-3¼x4½	115	32x4	1885	1885	†2200	2885	2885
Velie 34	Falls	6-3½x4¼	112	32x3½	1485	1485	....	....	2485
Vogue 6-55	H-S	6-3¼x5	124	32x4	....	2285	2360	3050	3050
Vogue 6-66	Cont.	6-3½x5¼	124	33x4½	....	2485	2560	3250	3250
Washington	Own	6-3½x4½	114	32x4	....	1685	....	....	....
Wasp 2611	Wisc	4-4¾x5½	132	33x5	....	†6500	....	....	45
Westcott C-48	Cont.	6-3½x5¼	125	32x4½	....	2990	2990	....	4590
Westcott C-38	Cont.	6-3¼x4½	118	33x4	2290	2290	....	3390	3390
Wharton A	Curt.	8-4 x5	136	34x4½	....	†4885	4885	....	....
Wills-Sainte Claire	Own	8-3½x4	121	32x4½	3500	3500	....	....	....
Willys-Knight 20	Own	4-3⅝x4½	118	33x4	2195	2195	....	2845	2945
Winther 61	H-S	6-3½x5	120	33x4	....	....	....	....	....
Winton 25	Own	6-3¾x5¼	132	35x5	4600	†4975	4600	5950	†5950

*—6-passenger. †—4-passenger. ‡—3-passenger. ©—Special Body.

Engine Make: Cont—Continental. D.Ly—Dort Lycoming. Dues.—Duesenberg. GBS—Golden, Belknap & Swarts. H-S—Herschell-Spillman. Lyc—Lycoming. Nort—Northway. Rut—Rutenber. Tee—Teetor. Wal—Walther. Wisc—Wisconsin. Weid—Weidely. LeR—Leroi. Curt—Curtiss. §—Model 47—34x4½ Tires.

Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Acason, R	1	$2260	3¼x5½	36x3½	36x5	W
Acason, RB	1½	2485	3¾x5½	36x3½	36x6	W
Acason, H	2½	3295	4⅝x5¾	36x4*	36x4d*	W
Acason, L	3½	4295	4⅝x5¾	36x5*	36x5d*	W
Acason, M	5	5250	5 x6¼	36x6	40x12	W
Ace, C	1½	2750	3¾x5½	34x3½*	34x5*	W
Ace, A	2½	3450	4¼x5½	36x4*	36x7	W
Ace	3	3650	4¼x5½	36x6	36x8	W
Acme, B	1	2175	3¾x5	34x3½	34x5	W
Acme, F	1½	2475	3¾x5	34x3½	34x5	W
Acme, A	2	3050	4¼x5¼	36x4	36x7	W
Acme, C	3½	4050	4½x5½	36x5	40x10	W
Acme, E	5	5150	4¾x6	36x6	40x12	W
Acme, G	¾	1790	3¾x5	35x5†	35x5†	W
Akr'nMulti-Trk20	1	2485§	4 x5½	34x5	34x5	B
All-Power, C	3½	5800	4½x6	36x7	36x10	W
All-American, B-1	1	1795	3½x5	32x4	32x4	I
All-American C-1	1½	2195	3½x5	34x4	34x5	I
American, 25	2½	3575	4 x6	36x4*	36x4d*	W
American, 40	4	4575	4½x6	36x5*	36x5d*	W
Apex, G	1	1675	3¾x5	33x5†	33x5†	I
Apex, D	1½	1915	3¾x5½	34x3½	34x4	I
Apex, E	2½	2695	4¼x5½	36x4	36x7	I
Apex, F	3½	3975	4½x6	36x5	36x10	I
Armleder, HW	2½	....	4¼x5½	36x4*	36x7*	W
Armleder, KW	3½	....	4½x6	36x5	36x5d	W
Armleder, 20	1	....	3¾x5¼	34x3½*	34x5*	W
Atco, B	1½	....	3¾x5¼	34x5†	36x6*	I
Atco, B1	1½	....	3¾x5¼	34x5†	36x6†	I
Atco, A	2½	....	4¼x5½	36x4†	36x8*	W
Atlas, M.D	1	....	3½x5	32x4½†	32x4½†	W
Atterbury, 20R	1½	2775	3¾x5	34x3½	34x5	W
Atterbury, 7CX	2½	3375	4½x5¼	36x4	36x4d	W
Atterbury, 7D	3½	4175	4½x5½	36x5	40x5d	W
Atterbury, 8E	5	5575	4¾x6	36x5	40x6d	W
Autocar, 21UF	½–2	2300	4¾x4½*	34x4*	34x5*	D
Autocar, 21UG	1½–2	2400	4¾x4½*	34x4*	34x5*	D
Autocar, 26Y	....	4350	4¼x5½	34x5	36x10	D
Autocar, 26-B	....	4500	4¼x5½	34x5	36x10	D
Available, H1½	1½	2750	4 x5⅛	36x3½*	36x5*	W
Available, H2½	2½	3475	4 x5⅛	36x4*	36x8*	W
Available, H3½	3½	4475	4½x5½	36x5	40x5d	W
Available, H5	5	5375	4¾x6	36x6	40x12	W
Available, H7	7	6000	5 x6	36x6	40x14	B
Avery	1	....	3 x4	34x5†	34x5†	I
Beck, A. Jr.	1	1800	3¾x5	34x3½	34x4	I
Beck, C	2	2550	4½x5½	36x4	36x6	I
Bell, O	2½	2750	4½x5½	34x4	34x7	I
Bell, E	1½	2250	3¼x5¼	34x3½	34x5†	I
Belmont, E	2	2195	3¾x5	34x3½*	34x6*	D
Belmont, D	3½	3195	4 x6	36x5*	36x5d*	D
Bessemer, G	1	1700	3½x5	35x5†	35x5†	I
Bessemer, H–2	1½	2445	3¾x5	36x3½	36x5	I
Bessemer, J–2	2½	3285	4½x5¼	36x4	36x4	I
Bessemer, K–2	4	4485	4½x5½	36x6	36x10	I
Bethlehem, K	1	1695	3½x5	34x4½†	35x5	I
Bethlehem, G	2	2725	4 x5¼	34x3½*	34x6*	I
Bethlehem, H	3	3250	4 x5½*	36x4*	36x8	I
Bethlehem, J	4	4195	4½x5½	36x5*	36x5d*	I
Bollstrom, 30	1½	2100	3¾x5¼	34x3½	34x6	I
Bollstrom, 50	2½	2800	4¼x5½	36x4	36x8	I
Bollstrom, 70	3½	3800	4½x6	36x5	36x10	I
Bollstrom, A-20	4	6000	5¾x7	40x8†	40x8†	I
Bollstrom, B21	4	5050	4½x5½	36x7	36x7	I
Bridgeport, A	1½	2350	3¾x5¼	34x3	34x6	W
Bridgeport, B	2½	2850	4¼x5½	36x4*	36x7*	W
Bridgeport, C	4	3650	4½x6	36x5	36x5d	W
Bridgeport, D	6	4500	4½x6	36x6	36x6d	W
Brinton, F	2½	3400	4¾x5¼	36x4	36x7	W
Brockway, E	¾	1675	3¾x5	35x5†	35x5†	B
Brockway, S–4	1½	2250	3¾x5	36x3½*	36x5*	W
Brockway, K–5	2½	3200	4¼x5½	36x4	36x7	W
Brockway, R–4	3½	4100	4½x5½	36x5	36x5d	W
Brockway, T	5	5250	4¾x6	36x6	40x6d	W
Case, ††	2	3000	4¼x5¾	36x6	38x7	I
Capitol, G1½	1½	2975	3¾x5	35x5	38x7	W
Capitol, H2½	2½	3700	4¼x6	36x4	36x8	W
Capitol, K2½	2½	4250	4¼x6	36x6	42x9	W
Capitol, M3½	3½	4425	4¼x6	36x5	36x10	W
Champion Light Commercial	1½	1100	3½x5	32x3½	32x3½	I
Chevrolet, G	¾	920	3⅛x4	31x4†	34x4½†	B
Chevrolet, T	1	1325	....	33x4†	35x5†	W
Chicago, C1½	1½	....	3¾x5½	36x3½*	36x5*	W
Chicago, C2½	2½	....	4 x5½	36x4*	36x7*	W
Chicago, C3½	3½	....	4½x5½	36x5	36x10	W
Chicago, D5	5	....	4½x5½	36x6	40x12	W
Climber, A 20	1½	2450	3½x5	36x6*	38x7*	I
Clydesdale, 32C	1	2375	4¾x5	34x3½*	34x5*	W
Clydesdale, 42C	1½	2750	4¾x5	36x3½	36x5	W
Clydesdale, 65C	2½	3540	4¼x5½	36x4	36x7	W
Clydesdale, 65EC	2½	3775	4½x5½	36x4	36x7	W
Clydesdale, 90C	3½	4400	4½x5½	36x5	40x10	W
Clydesdale, 120C	5	5500	4¾x6	36x6	40x12	W
Collier, 18	1	....	3¾x5	34x4	34x5	W
Collier, 19	1½	....	3¾x5	36x4	36x6	W
Collier, 21	2	....	4½x5¼	36x4	36x7	W
Collier, 22	2½	....	4½x5¼	36x4	36x4	W
Columbia, H	1½	2350	3¾x5	35x5†	34x5	I
Columbia, G	2½	2850	4 x5¼	36x4	36x7	I
Comet	1½	....	3¾x5	34x4	34x4	W
Commerce, T	¾	1450	3¾x5	34x4½†	34x4½†	B
Commerce, 12	1½	1800	3¾x5	35x5†	35x5†	I
Commerce, 16	2	2150	3¾x5	35x5†	35x6†	I
Concord, A	1¼	2700	4 x5½	36x3½	36x6	W
Concord, B	2½	3600	4¼x5½	36x4	36x8	W
Concord, AX	1½	2950	4 x5½	36x3½	36x6	W
Concord, BX	2½	3600	4½x5½	36x4	36x8	W
Cook, 41	2	3000	4 x5½	36x6†	38x7†	I
Corbitt, E	1	2400	3¾x5	34x3½	34x4	W
Corbitt, D	1½	2800	3¾x5	36x3½	36x5	W
Corbitt, C	2	3500	4½x5¼	36x3½	36x7	W
Corbitt, B	2½	3650	4½x5¼	36x4	36x7	W
Corbitt, A	3½	4500	4½x5½	36x5	36x10	W
Corbitt, AA	5	5500	4¾x6	36x6	40x6d	W
Cyclone	1½	2800	3½x5	34x5†	36x6†	I
Dart, S	1½	....	3¾x5½	34x3½	34x6	W
Dart, M	2½	....	4¼x5½	36x4	36x7	W
Dart, W	3½	....	4½x6	36x5	36x10	W
Day-Elder, A	1	2225	3¾x5	34x3½	34x4	W
Day-Elder, B	1½	2425	3¾x5	34x3½	34x5	W
Day-Elder, D	2	2900	4½x5¼	36x4*	36x7	W
Day-Elder, C	2½	3125	4¼x5	36x4	36x7*	W
Day-Elder, F	3½	3950	4½x5½	36x5*	36x5d*	W
Day-Elder, E	5	4875	4½x6	36x5	36x6d	W
Dearborn, F	1½	2180	3¾x5⅛	34x4*	34x5*	W
Dearborn, 48	2	2590	3¾x5⅛	35x5†	34x7†	W
Defiance, D	1½	2550	3¾x5	35x5†	36x6†	I
Defiance, E	2	2750	3¾x5	35x5†	38x7†	I
DeKalb, E2	2½	2250	4½x5¼	34x3½*	36x5*	W
DeKalb, E2½	2	2600	4½x5¼	36x4*	36x6*	W
DeMartini 1½	1½	2600	3¾x5	34x3½	34x6	W
DeMartini 2	2	3300	4 x5½	36x3½	36x7	W
DeMartini 3	3	4250	4¼x5½	36x4	36x10	W
DeMartini 4	4	4800	4½x6	36x5	36x12	W
Denby, 33	1½	2300	3¾x5	35x5†	38x7†	I
Denby, 134	2	2800	3¾x5	36x3½	36x6	I
Denby, 25	3	3600	4½x5¼	36x4	36x7	I
Denby, 27	4	4600	4½x5½	36x5	36x5d	I
Denby, 210	5	5350	4½x5½	36x6	40x6d	I
Dependable, A	¾–1	1650	3½x5	34x5	36x6	W
Dependable, C	1½	2350	3¾x5¼	34x3½	34x5	W
Dependable, D	2	2650	4 x5½	34x5	36x6	W
Dependable, E	2½	2950	4¼x5½	36x4	36x7	W
Dependable, G	3½	3350	4½x6	36x6	38x7	W
Diamond T, O	1	2500	3¾x5¼	34x5†	36x6†	W
Diamond T, FS	1½	2960	.....	36x3½	36x5	W
Diamond–T, T	1½	2650	3¾x5¼	36x3½	36x5	W
Diamond–T, U	2	3285	4 x5¼	36x4	36x7	W
Diamond–T, K	3½	4675	4¼x5½	36x5	36x5d	W
Diamond–T, EL	5	5400	4½x5½	36x6	40x6d	W
Diamond–T, S	5	5650	4¾x6	36x6	40x6d	W
Diehl, A	1	....	3½x5	34x4½	35x5	I
Diehl, B	1½	....	3½x5	36x6	36x6	I
Dispatch, F	1	1350	3¾x5	34x4†	34x4†	I
Doane	2½	....	4¼x5¾	36x5	36x7	C
Doane	3½	....	4½x5¾	36x5	36x5d	C
Doane	6	....	4¾x6¾	36x6	40x6d	C
Dodge Brothers	½	1085	3⅞x4½	33x4†	33x4†	B
Dorris, K–4	2	3400	4¼x5½	36x4	36x7	W
Dorris, K–7	3½	4400	4¼x5½	36x5	36x10	W
Double Drive C	1½	2800	3¾x5½	5	4	W
Double Drive B	3	4000	4¼x5½	6	6	W
Douglas G	1½	2050	3¾x5⅛	36x5*	37x8*	W
Douglas I	3	3250	4¼x5½	36x6*	37x8*	W
Duplex, A	1½	2775	4 x5¼	35x5†	38x7†	W
Duplex, E	3½	4250	4¼x5½	36x8	36x8	I
Duty, 21	2	1490	3½x5	34x3¾	34x5	I
Eagle, 100–2	2	2275	3¾x5¼	34x3½*	34x6*	I
Erie, A	2½	....	4¼x5½	36x4	36x4d	W
Facto, 1921	2½	2895	4¼x5½	36x4*	36x8*	W
Fageol, (Cal.)	1½	3000	3¾x5¼	34x3½*	34x6*	W
Fageol, (Cal.)	2½	3900	4¼x5¾	34x4	36x7	W
Fageol (Ohio) Md	2½	3900	4½x5¾	36x4*	36x4*	W
Fageol (Ohio) Hd	3½	5000	4½x6¼	36x5*	40x5d*	W
Fageol, (Cal.)	3½	5000	4½x6¼	36x5	36x5d	W
Fageol, (Cal.)	5	5700	4½x6¼	36x6	40x6d	W
Famous, B10	1	1800	3½x5	36x2½	36x4	I
Famous, B12	1½	2100	3¾x5	36x3½	36x5	I
Fargo, R	2	2500	3¾x5	36x4	36x6	I
Federal, SD	1	2500	3¾x5	35x5†	36x6†	W
Federal, TE	1½	2725	4¼x5¼	36x3½	36x5	W
Federal, UE	2	3025	4¼x5¼	36x4	36x7	W
Federal, WE	3½	3950	4½x5½	36x5	36x5d	W
Federal, X 2	5	5350	4½x5½	36x6	40x6d	W
Ford, TT	1	545	3¾x4	30x3½*	32x4½*	W
Forschler, A	1	....	3½x5	36x3	36x4	W
Forschler, AX	1½	....	3½x5	36x3½	36x5	W
Forschler, B	2	....	4½x5¼	36x4	36x7	W
Forschler, BX	3	3450	4½x5¼	36x4	36x8	W
F.W.D., B	3	4200	4¾x5½	36x6	36x6	B
Fulton, A	¾	1750	3½x5	35x5†	35x5†	B
Fulton, C	2	2350	3½x5	34x4	34x6	I
Garford, 25	1¼	2090	3¾x5½	36x3½	36x4	W
Garford, 70–H	2	3190	4¼x5½	36x4	36x7	W
Garford, 68D	5	5200	5 x6½	36x6	40x6d	W
Garford, 77D	3½	4390	4½x6	36x5	36x6d	W
Garford, 150–A	7½	5500	5x6½	36x6	40x7d	C
Gary, F	1	2100	3¾x5	36x3½	36x4	W
Gary, I	1½	2550	4¼x5½	35x5†	38x7†	W
Gary, J	2½	3150	4¼x5½	36x6*	40x8*	W
Gary, K	3½	4050	4½x6	36x5	40x5d	W
Gary, M	5	5150	5 x6½	36x6	40x6d	W
G.M.C., 16	¾	....	3¾x5	35x5†	35x5†	B
G.M.C., 31	1½	....	3¾x5	36x3½	36x5	W
G.M.C., 41	2	....	4¼x5¼	36x4	36x7	W
G.M.C., 71	3½	....	4½x5½	36x5	40x5d	W
G.M.C., 101	5	....	4½x5½	36x6	40x6d	W
Gersix M	1½	3100	4 x5½	36x3½	36x7	W
Gersix K	2½	3500	4½x5½	36x4	36x8	W
Gersix	3½	4500	4½x6	36x5	40x12	W
Giant, 15–A	1½	2425	3¾x5	34x3½	34x5	W
Giant, 16	2	3250	4¼x5¼	36x4	36x7	W
Giant, 17	3½	4150	4½x5½	36x5	36x5d	W
Golden West, G	3½	....	4½x5½	36x6	36x6	W
Golden West, H	3½–4	....	4½x6	36x6	36x6	W
Golden West, HA	7	....	4½x6	36x6	36x10	W
Golden West, GH	3	....	4½x6	36x6	36x6	W
Golden West, T	4	....	4¾x6	36x6	36x6	W
Golden West, K	7	....	5½x6	36x6	36x6	W
Gove, A1	2½	....	4½x5¼	36x4*	36x7*	I
Graham Bros. A	1½	2495	3¾x5	35x5†	36x6†	I
Gramm-Bern., 10	1	1495§	3½x5	33x5†	33x5†	B
Gramm-Bern., 15	1½	2050§	3¾x5	36x3½*	36x5*	I
Gramm-Bern., 65	1½	2725§	3¾x5	36x3½*	36x5	W
Gramm-Bern., 20	2	3175§	4½x5¼	36x4*	36x7*	W
Gramm-Bern., 25	2½	3575§	4¼x5½	36x4*	36x4d*	W
Gramm-Bern., 35	3½	4375§	4½x5½	36x5	40x5d*	W
Gramm-Bern., 50	5	5275§	4¾x6	36x6	40x6d*	W
G.W.W.	1½	2100	3¾x5½	35x5	35x5	I
Hahn, J4	1	....	3¾x5	34x5*	34x5*	W
Hahn, CD	1½	....	4½x5½	36x3½*	36x6*	W
Hahn, EE	2½	....	4½x5½	36x4*	36x8*	W
Hahn, F	3½	....	4½x5½	36x5*	36x10 *	W
Hahn, EF	5	....	4¾x6	36x6	40x12	W
Hal-Fur, E	1	2350	4 x5	35x5†	35x5†	W
Hal Fur, B	2½	3250	4½x5½	35x5*	38x7*	W
Hal Fur, F	3½	4250	4½x5½	36x6†	40x10†	W
Hall	1½	3100	3¾x5	34x5†	33x7†	W
Hall	2½	3275	4½x5¼	36x4	36x6	W
Hall	3½	4100	4½x5½	36x5	36x5d	W
Hall	5	5100	4½x5½	36x5	40x6d	W
Hall	7	5100	4½x5½	36x5	40x6d	C
Harvey, WEA	1½	2550	4½x5½	34x3½	34x5	W
Harvey, WFA	2½	3300	4½x5½	36x4	36x7	W
Harvey, WHA	3½	4300	4½x6	36x5	36x5d	W
Harvey, WKA	5	5200	4½x6	36x6	40x6d	W
Hawkeye, K	1½	2365	3¾x5¼	34x3½*	34x5*	I
Hawkeye, M	2	2915	4¼x5½	36x4*	36x6*	I
Hawkeye, N	3½	4345	4½x6	36x5*	36x10*	I
Hendricksen, K	5	4800	.....	.....	.....	..
Hendricksen, I	2½	3150	4¼x5¾	36x4*	36x7*	W
Hendricksen, J	3½	3975	4¼x5¾	36x5*	36x5d*	W
Highway, A410	4	....	4 x6	36x5	36x6d	W
Highway, B510	5	....	4 x6	36x5	40x6d	W
Higrade, A17	¾	1850	3½x5	32x4½	32x4½	W
Higrade, A18	1	2100	3½x5	35x5†	35x5†	W
Higrade, B20	1½	2500	4¼x5¼	35x4†	36x6†	W
Huffman, B	1½	1995	3¾x5	34x3½	34x6	W
Huffman, C	1½	1795	3¾x5½	34x3½	34x6	I
Hurlburt	1½	....	4 x5½	34x4	34x5	W
Hurlburt	2½	....	4¼x5½	36x4	36x4d	W
Hurlburt	3½	....	4½x6	36x5	36x5d	W
Hurlburt	5	....	4½x6	36x5	40x6d	W
Huron Erie	1½	2425	3¾x5¼	36x3½	36x5	I
Huron Mich.	2½	2950	4¼x5½	36x4	36x7	W
Indep'd't(Iowa),G	1½	2040	3¾x5¼	34x3½	34x5	I
Indep'd't(Ia.),H.I.	2½	2940	4½x5¼	34x4	34x6	I
Indep'd't(Iowa), B	1	1665	3½x5	34x3½	34x4	W
Indep't'd(Ohio), F	1½	2585	3¾x5	36x3½	36x5	W
Indep't'd(Ohio), H	2½	3285	4½x5½	36x4	36x4d	W
Indep'd't(Ohio) K	3½	4285	4½x5½	36x5	36x5d	W
Indiana, 12	1¼	....	3¾x5¼	34x3½*	34x5*	W
Indiana, 20	2	....	4½x5½	36x4*	36x7*	W
Indiana, 25	2½	....	4½x5½	36x4*	36x8*	W
Indiana, 35	3½	....	4½x5½	36x5*	36x5d*	W
Indiana, 51	5	....	5 x6¼	36x5*	40x6d*	W
Inland, D	2	2950	4 x5	34x5	34x6	I
International, 21	1	1850	3½x5¼	36x3½	36x3½	I
International, S	¾	1500	3½x5	34x5†	34x5†	I
International, 31	1½	2050	3½x5¼	36x3½	36x4	I
International, 41	2	2400	3½x5¼	36x3½	36x5	I
International, 61	3	2800	4¼x5	36x4*	36x6*	I
International, 101	5	4500	4¼x5	36x5	40x10	I
Jackson, 4WD	3½	4550	4¼x5½	36x7	36x7	B
Jumbo, 15	1½	2425	3¾x5¼	36x3½	36x5	I
Jumbo, 20	2	2675	3¾x5¼	35x5†	38x7†	I
Jumbo, 25	2½	3090	3¾x5¼	36x4	36x7	I
Jumbo, 30	3	3590	4¼x5½	36x6†	42x9†	I
Jumbo, 35	3½	4080	4½x6	36x5	36x10†	I
Jumbo, 40	4	4730	4 x6	38x7†	44x10	I
J & J, D	2	3250	4 x5	34x4*	34x6	I
Kalamazoo, G-1	1½	2800	3¾x5	34x4	34x5	W
Kalamazoo, G-2	1½–2	3100	3¾x5	36x4*	36x5*	W
Kalamazoo, H	2½	3700	4 x6	36x4	36x8	W
Kalamazoo, K	3½	4300	4¼x6	36x5	36x10	W
Karavan, A	2½	....	4¼x6	36x4	36x8	W
Kearns, H	¾	1600	3¼x4½	32x4½†	32x4½†	I
Kearns, N	1½	2200	3½x5	34x3½	34x6	I
Kelly–S, K–31	1½	2900	3¾x5¼	36x3½	36x6	C
Kelly–S, K–35	2½	3250	3¾x5¼	36x4	36x4d	C
Kelly–S., K–34	1½	2900	3¾x5¼	36x3½	36x6	W
Kelly–S., K–36	2½	3250	3¾x5¼	36x4	36x4d	W
Kelly–S., K–40	3½	4200	4½x6½	36x5	40x5d	C
Kelly–S., K–50	5	4900	4½x6½	36x6	40x6d	C
Kelly–S., K–60	6	5100	4½x6½	36x6	40x7d	C
Kelly–S., K–41	3½	4200	4½x6½	36x5	40x5d	I
Kelly–S., K–42	3½	4200	4½x6½	36x5	40x5d	W
Kelly-Springfield K-45	4	4550	4½x6½	36x5	40x6d	C
Keystone, 40	2	2450	3¾x5½	34x5†	38x7†	I
Kimball, AB	2	3675	4 x6	36x4	36x7	W
Kimball, AC	2½	3975	4¼x6	36x4	36x8	W
Kimball, AK	3	4500	4½x6	36x4	36x10	W
Kimball, AE	4	5000	4¾x6	36x5	40x10	W
Kimball, AF	5	5975	5 x6	36x6	40x12	W
Kissel, Express	1	1985††	4 x5½	34x5†	34x5†	W
Kissel, Utility	1½	2775	3¾x5½	36x3½	36x5	W
Kissel, Freighter	2½	3475	4¼x5½	36x4	36x7	W
Kissel, H. D.	4	4475	4½x5½	36x5	36x5d	W
Kleiber, AA	1	2600	4½x5¼	34x3½*	34x5*	W
Kleiber, A	1½	3100	4½x5¼	36x3½*	36x6*	W
Kleiber, A	1½	3100	4½x5¼	36x3½*	36x6*	W
Kleiber, BB	2	4000	4½x5¼	36x4*	36x7*	W
Kleiber, B	2½	4200	4½x5½	36x5*	36x8	W
Kleiber, C	3½	4900	4½x5½	36x5	36x5d	W
Kleiber, D	5	5600	5 x6½	36x6	40x12	W
Koehler, D	1½	2285	3½x5	34x3½	34x5	W
Koehler, M	2½	3365	4 x5½	36x4	36x7	W
Koehler, MCS	2½	3450	4 x5½	36x4	36x7	W
Koehler, F	3½	....	4½x5½	36x5	36x10	W
Koehler,MT, Trac	5	3450	4 x5½	36x4	36x7	W
K–Z, 1	1	2250	3½x5	34x3½	34x5	W
K–Z, 1½	1½	2750	3¾x5	36x4	36x6	W
K–Z, 2½	2½	3250	4½x5½	36x4	36x8	W
K–Z, 3½	3½	4250	4½x5½	36x5	40x10	W
K–Z, 5	5	5200	4½x5½	36x6	40x6d	W
Lange, B	2½	3300	.....	36x4*	36x6*	C
Larrabee, U	1½	2400	3¾x5	34x3½	34x5	W

See next page for notes on truck specifications.

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Larrabee, K	2½	3400	4½x5½	36x4	36x7	W
Larrabee, L	3½	4200	4½x5½	36x5	36x5d	W
Larrabee, W	5	5100	4¾x6	36x6	40x6d	W
L.M.C., 2-20	2½	2540	4½x5½	36x4	36x4d	I
Lion, L	1	$2350	3¾x5⅛	35x5†	35x5†	W
Lone Star, 9	1½	1545	3½x5	32x3½†	32x4†	I
Luedinghaus, K	2-2½	3150	4½x5¾	36x4*	36x7*	W
Luedinghaus, C	1	2100	3½x5	35x5†	35x5†	W
Luedinghaus, W	1½	2700	3¾x5½	34x3½*	34x5*	W
Maccar, L	1½	2925	4½x5½	36x4	36x6	W
Maccar, H	2½	3650	4½x5½	36x4	36x4d	W
Maccar, M-2	3½	4500	4½x6	36x5	36x5d	W
Maccar, G	5	5500	4¾x6	36x5	40x6d	W
MacDonald, A	15	5750	4½x6	40x7	40x14	I
Mack, AB D.R.	1½	3450	4 x5	36x4	36x3½d	D
Mack, AB Chain	1½	3000	4 x5	36x4	36x3½d	C
Mack, AB Chain	2	3300	4 x5	36x4	36x4d	C
Mack, AB D.R.	2	3750	4 x5	36x4	36x4d	D
Mack, AC Chain	3½	4950	5 x6	36x5	40x5d	C
Mack, AC Chain	5	5500	5 x6	36x6	40x6d	C
Mack, AC Chain	6½	5750	5 x6	36x6	40x12	C
Mack, AC Chain	7½	6000	5 x6	36x7	40x7d	C
Mack Trac., AB	5	3400	4 x5	36x4	36x4d	C
Mack Trac., AC	7	4950	5 x6	36x5	40x5d	C
Mack Trac., AC	10	5500	5 x6	36x6	40x6d	C
Mack Trac., AC	13	5750	5 x6	36x6	40x12	C
Mack Trac., AC	15	6000	5 x6	36x7	40x7d	C
Mapleleaf, AA**	2	4150	4 x5¼	34x4	36x6	W
Mapleleaf, BB**	3	4775	4½x5½	36x4	36x4d	W
Mapleleaf, CC**	4	5770	4½x5½	36x5	36x5d	W
Mapleleaf, DD**	5	6825	4½x5½	36x6	40x6d	W
Master, JW	1½	2690	4½x5½	34x3½	34x5	W
Master, W	2½	3290	4¼x5½	34x4	36x7	W
Master, D	2½	3540	4¼x5½	34x4	36x7	D
Master, A	3½	4190	4½x6	36x5	40x5d	W
Master, E	3½	4640	4½x6	35x5	40x5d	D
Master, B	5	5290	4¾x6½	36x6	40x6d	W
Master, F	5	5440	4¾x6½	35x5	40x6d	D
Master Trac., T	6	3740	4¼x5½	34x4	36x4d	I
Maxwell, 1½	1½	1332	3⅝x4¼	32x3	32x4	W
Menominee, HT	1	2080	3¾x5	34x3½	36x5	W
Menominee, H	1½	2725	4 x5	36x3½	36x5	W
Menominee, D	2	3245	4 x6	36x4	36x4d	W
Menominee, G	3½	4270	4½x6	36x5	36x5d	W
Menominee, J3	5	5450	4¾x6	36x6	40x6d	W
Meline, 10	1½	2450	3½x5	34x5†	36x6†	I
Moreland, 20N	1	2850	3¾x5	35x5†	36x6†	I
Moreland, 20B	1½	3125	4½x5¼	36x3½	36x6	W
Moreland, 20C	2½	3900	4½x5½	36x4	36x8	W
Moreland, 20G	3½	4975	4¾x6	36x5	40x5d	W
Moreland, 20J	5	5350	4¾x6	36c6	40x6d	W
Mutual, 2B	2	3450	4 x6	36x4	36x8	W
Mutual, 2BP	2½	4150	4 x6	38x7†	42x9†	W
Napoleon, 7	¾-1	1350	3½x5	38x4	33x4†	I
Napoleon, XX-7	1	1535	3½x5	35x5*	35x5*	I
Napoleon, 11	1½	1860	3½x5	35x5*	36x6*	I
Nash, 2018	1	1895	3¾x5¼	34x3	34x4	I
Nash, 3018	2	2550	3¾x5¼	34x4	34x6	I
Nash, Quad.	2	3250	4¼x5½	36x5	36x5	I
*Nelson, F1½	1½	....	4½x5¼	36x3½	36x5	W
*Nelson, F2	2	....	4½x5¼	36x4	36x7	W
*Nelson, F3½	3½	....	4½x5½	36x5	36x5d	W
*Nelson, FC5	5	....	4¾x6	36x6	40x6d	W
Netco, D	2	3100	4½x5¼	36x4*	36x7*	W
Netco, H	2½	3500	4½x5½	36x4*	36x8*	W
New York, M	1½	....	4½x5¼	36x3½	36x5	W
New York, N	2-2½	....	4½x5¼	36x4	36x4d	W
Niles, E	2	3000	4½x5¼	36x4*	36x7*	W
Noble, B30	1½	2585	3¾x5¼	36x3½	36x5	W
Noble, C40	2	2825	4 x5½	36x4	36x7	W
Noble, D50	2½	3150	4½x5½	36x4	36x8	W
Noble, E70	3½	4030	4½x6	36x5	36x10	W
Northway, B-2	2	3400	¾ x6	36x4	36x4d	W
Northway, B-3	3½	4400	4 x6	36x5	40x5d	W
Northwestern W	2	3300	4½x5¼	34x4	36x6	W
Northwestern WS	2½	3300	4½x5½	36x4	36x8	W
Norwalk, 2SE	1	1695	3½x5	34x3½	34x4	W
Norwalk, 3SE	1½	2025	3½x5	34x3½	34x3½d	W
Ogden, A1	1½	2550	3¾x5	36x3½	36x5	W
Ogden, E	2½	3250	4½x5¼	36x4	36x7	W
O. K., K1	1½	2675	4 x5½	36x3½†	36x7†	W
O. K., L1	2½	3450	4¼x5½	36x4	36x8	W
O. K., M1	3½	4250	4½x6	36x5	36x5d	W
Old Hickory, W	1	2175	3¾x5	36x3½*	36x4*	W
Old Reliable, A	1	2350	4 x5	34x4	36x6	W
Old Reliable, B	1½	3500	4¼x6	34x4	36x4d	W
Old Reliable, C	2½	4250	4¼x6	36x5	36x5d	W
Old Reliable, D	3½	5250	4¾x6	36x6	40x6d	W
OldReliable,KLM	5	6250	1¾x6½	36x6	40x7d	C
Oldsmobile Econ.	1	1500	3††x5¼	35x5†	35x5†	I
Olympic, A	2½	3500	4¼x5½	36x4	36x7	W
Oneida, A-9	1½	2350	3¾x5¼	36x3½	36x5	W
Oneida, B-9	1¾	2915	4 x5¼	36x4	36x7	W
Oneida, C-9	2½	3390	4 x5¼	36x4	36x7	W
Oneida, D-9	3½	4345	4½x5½	36x5	36x10	W
Oneida, E-9	5	5460	4½x5½	36x6	40x12	W
Orleans, A	1½	2750	3¾x5⅛	36x3½	36x5	W
Orleans, B	2½	3250	4x5½	36x4*	36x7*	W
Orleans, C	3½	3750	4½x5½	36x4½	36x8	W
Orleans, D	5	4250	4½x5½	36x6	40x8	W
Oshkosh, A	2	....	3½x5	36x6†	36x6†	4
Oshkosh, AA	2	....	3½x5	36x6†	36x6†	4
Packard, EC	....	3700	4⅞x5½	36x3½	36x6	W
Packard, ED	....	4450	4½x5½	36x5	36x5d	W
Packard, EF	....	5550	5 x5½	36x6†	40x6d†	W
Packard, EX	....	4200	4⅞x5½	36x6†	38x7†	W
Paige, 52-19	1½	2880	4 x5¼	34x3½	34x6	W
Paige, 54-20	2½	3400	4¼x5½	34x4	34x4d	W
Paige, 51-16	3½	4285	4½x5½	36x5	36x5d	W
Parker ,FZ0	2	3500	4 x6	34x4	36x4d	W
Parker, JZ0	3½	4400	4½x6	36x5	40x5d	W
Parker, MZ0	5	5500	4¾x6	36x6	40x6d	W
Patriot, Revere	¾	1785	3¾x5	35x5†	35x5†	W
Patriot, Lincoln	1½	2450	4 x5¼	34x3½*	34x5*	W
Patriot, Washgt'n	2½	$3450	4½x5½	36x4*	36x7*	W
Piedmont, 4-30	1½	1685	3½x5	34x4†	34x4†	W
Pierce-Arrow,	2	3750	4 x5½	36x4	36x4d	W
Pierce-Arrow	3½	4950	4½x6¾	36x5	36x5d	W
Pierce-Arrow	5	5700	4½x6¾	36x5	40x6d	W
Pioneer, 59	1	1650	3¾x4½	32x4½†	32x4½†	W
Pittsburger, B	2½	3500	4½x5¼	36x5*	36x7*	W
Pony	¾	400	2¾x4	28x3†	28x3†	C
Power, F	1½	....	3¾x5¼	36x6	36x6	W
Power, C	3½	....	4¼x5½	36x5	40x10	W
Premocar, B-143	1½	2475	3½x5	36x6†	36x6†	W
Rainier, R-11	¾	2150	3½x5	35x5†	35x5†	W
Rainier, R-15	3½	4500	4½x5½	36x5	36x5d	W
Rainier, R-19	1	2350	3½x5	34x3½	31x4	W
Rainier, R-16	1½	2600	3¾x5	34x3½	34x5	W
Rainier, R-18	2	2950	4¼x5¼	34x4	34x6	W
Rainier, R20	2½	3600	4½x5½	34x4	34x7	W
Rainier, R17	5	5250	4½x5½	36x6	36x6d	W
Ranger, TK-20-2	2	....	3¾x5	36x6†	36x6†	W
Reo, F	¾-1½	1385	4½x4½	34x4½†	34x4½†	B
Reliance, 10A	1½	2500	4 x5½	36x3½	36x5	I
Reliance, 20B	2½	3200	4½x5½	36x4	36x4d	I
Republic, 10	1	1695	3¾x5	35x5†	35x5†	I
Republic,10Exp.††	1	2095	.....	35x5†	35x5†	I
Republic, 11X	1½	2295	3¾x5	34x3½	34x5	I
Republic, 19	2½	2795	4¼x5¼	36x4	36x7	I
Republic, 20	3½	3895	4½x5½x	36x5	36x10	I
Riker, B	3	....	4¼x6	36x5	36x5d	W
Riker, BB	4	....	4¼x6	36x5	36x6d	W
Rowe, CW	1½	3000	3¾x5	36x6†	36x6†	W
Rowe, HW	4	4500	4¼x6	36x5	36c6d	W
Rowe, C. D. W.	2	3300	4 x5	34x4	36x3½d	W
Rowe, G. S. W.	3	4150	4 x6	34x5	36x5d	W
Rowe, G. P. W.	3	5250	3¾x5‡	38x7†	42x9†	W
Rowe, F. W.	5	5500	4½x6	36x6	40x6d	W
Rumely, A	1½	2720	3¾x5¼	36x3½	36x5	W
Samson, KO 15	¾	865	.....	32x4	32x4	B
Samson, E 25	1¼	1395	.....	35x5	35x5	B
Sandow, G	1	2295	3¾x5	34x3½	34x5	W
Sandow, CG	1½	2590	3¾x5	34x4	34x6	W
Sandow, J	2½	3375	4½x5¼	36x4	36x7	W
Sandow, M	3½	4295	4½x5½	36x5	36x5d	W
Sandow, L	5	4975	4½x5½	36x6	40x6d	W
Sanford, 25	2½	3350	4½x5¼	36x4	36x4d	W
Sanford, 35	3½	4200	4½x5½	36x5	36x5d	W
Sanford, 50	5	5100	4¾x6	36x5	40x6d	W
Schacht, 2-Ton	2	3550	4¼x5½	36x4	36x7	W
Schacht, 2½-Ton	2½	3850	4¼x5½	36x4	36x4d	W
Schacht, 3½-Ton	3½	4350	4¼x6	36x5	36x5d	W
Schacht, 5-Ton	5	5350	4½x6	36x5	40x6d	W
Schwartz, A	1	1585	3½x5	33x4½†	33x4½†	B
Schwartz, BW	1½	2600	3¾x5¼	34x3½*	34x7*	W
Schwartz, C.W.S.	2½	3200	4¼x5½	36x4	36x8	W
Schwartz, DW	5	4900	4½x6	36x6	40x12	W
Selden, 1½A	1½	2360	3¾x5	34x3½	34x5	W
Selden, 2½A	2½	3425	4½x5¼	36x4	36x7	W
Selden, 3½A	3½	4175	4½x5½	36x5	36x10	W
Selden, 5A	5	5600	4¾x6	36x6	40x12	W
Seneca, M20	½	....	3½x4½	30x3½†	30x3½†	B
Service, 220	1	2415	3½x5⅛	34x3½	34x5	W
Service, 15	¾-1	1840	4⅝x5	34x4½	34x5	B
Service, 31	1½	2985	4 x5½	36x3½	36x6	W
Service, 36	1½	3415	4¼x5½	35x5†	38x7†	W
Service, 51	2½	3475	4¼x5½	36x4	36x7	W
Service, 71	3½	4285	4¼x5½	36x5	36x5d	W
Service, 76	3½	4485	4½x6	36x5	36x5d	W
Service, 101	5	5275	4½x6	36x6	40x6d	W
Shaw, M2	¾	....	3¾x5	32x4	32x4	B
Shaw, M4	1	....	3¾x5	34x4½	34x4½	W
Signal, NF	1	2475	4⅝x5	34x5†	36x6†	W
Signal, H	1½	2925	4½x5¼	34x4	36x6	W
Signal, J	2½	3275	4½x5¼	34x4	36x8	W
Signal, M	3½	4275	4½x5½	36x5	40x5d	W
Signal, R	5	5300	4¾x6	36x6	40x6d	W
Southern, 10	1	2090	3¾x5	34x4½	34x4	W
Southern, 15	1½	2590	3¾x5¼	36x6†	34x4	W
Southern, 15	2	2990	4 x5¼	36x6†	40x8*	W
Standard, 1-K	1-1¼	2250	3¾x5	34x3½*	34x4*	W
Standard, 1K	1-1¼	2600	3¾x5	36x6†	36x6†	W
Standard, 76	2½-3	3100	4½x5¼	36x4*	36x7*	W
Standard, 66	3½-4	4000	4½x5½	36x5	36x5d	W
Standard, 5-K	5-6	5250	4¾x6	36x6	40x6d	W
Sterling, 1½	1½	3200	4 x5¾	36x3½	36x5*	W
Sterling, 2	2	3500	4 x5¾	36x4	36x6*	W
Sterling, 2½	2½	3650	4⅜x5¾	36x4*	36x4d*	W
Sterling, 3½	3½	4650	4½x6¼	36x5*	40x5d*	W
Sterling, 5-W	5	5500	5 x6¼	36x6*	40x6d*	W
Sterling, 5-C	5	6000	5 x6¼	36x6	40x6d	C
Sterling, 7½	7½	6500	5 x6¼	36x6	40x7d	C
Stewart, 11	¾	1350	3½x4½	32x4†	32x4†	I
Stewart, 12	1	1750	3½x5	35x5†	35x5†	I
Stewart, 9	1½	2200	3¾x5	34x3½	34x5	I
Stewart, 7	2	2800	4½x5¼	34x4	34x7	I
Stewart, 7-X	2½	2950	4¼x5½	34x4	34x7	I
Stewart, 10	3½	3850	4½x5½	36x5	36x5d	I
Stewart, 10-X	3½	3850	4½x6	36x5	36x5d	I
Stoughton, A	1	1995	3¾x5¼	34x4½†	35x5†	W
Stoughton, B	1½	2350	3¾x5¼	36x3½	36x5	W
Stoughton, D	2	2800	4 x5½	36x4	36x7	W
Stoughton F	3	3600	4¼x5½	36x5	36x5	W
Sullivan, E	2	3350	4¼x5½	36x4*	36x7*	W
Sullivan, H	3½	4650	4½x6	36x5	36x5d	W
Superior, D	1	1800	3¾x5	34x4½†	34x4	I
Superior, E	2	2750	4½x5¼	36x4	36x6	I
Super Truck, 50	2½	3300	4 x6	36x4	36x8	W
Super Truck, 70	3½	$4300	4¼x6	36x5	40x5d	W
Super Truck, 100	5	5300	4¾x6	36x5	40x12	W
Super Truck, 150	7½	6300	5 x6	36x6	40x7d	W
Texan, A38	¾	1095	3½x5	33x4	33x4	I
Texan, TK39	1½	1550	3½x5	36x6	38x7	W
Texan, TK	1½	....	3½x5	36x6†	38x7†	..
Tiffin, F15	1½	2695	4½x5¼	36x3½	36x5	W
Tiffin, F25	2½	3580	4½x5¼	36x4	36x3½d	W
Tiffin, F35	3½	4760	4½x5½	36x5	40x5d	W
Tiffin, F50	5	5850	4¾x6	36x6	40x6d	W
Tiffin, F60	6	6050	4¾x6	36x6	40x12	W
Titan, HT	3½	4550	4½x6	34x4*	40x5d	I
Titan, HD	6	5400	4½x6	36x5	40x6d	I
Titan, TS	2½	3400	4¼x5½	34x4*	36x4d	I
Tower, J	1½	3000	4¼x5¼	35x5	38x7	W
Tower, H	2½	3475	4½x5¼	36x4	36x7	W
Tower, G	3½	4400	4½x5½	36x5	36x5d	W
Traffic, C	2	1595	3¾x5	34x3½*	34x5*	I
Transport, 20	1	1850	3¾x5⅛	34x3½	34x4	I
Transport, 30	1½	2250	3¾x5	36x3½	36x5	I
Transport, 50	2½	2785	4¼x5½	36x4	36x7	I
Transport, 70	3½	4195	4½x6	36x5	36x10	I
Trayler, B	1½	2500	3¾x5⅛	34x3½	34x5	W
Trayler, C	2	3000	4 x5½	36x4	36x7	W
Trayler, D	3	3500	4¼x5½	36x4	36x8*	W
Trayler, E	4	4700	4½x6	35x5	40x10	W
Trayler, F	5	5100	4½x6	36x6	40x6d	W
Triangle, AA	¾-1	1600	3¼x5	35x5†	35x5†	I
Triangle, A	1½	2350	3¾x5¼	34x3½*	34x6*	I
Triangle, C	2	2700	3¾x5¼	36x4*	36x6*	I
Triangle, B	2½	2950	4 x5⅜	36x4*	36x7*	I
Triumph, HB	2	2900	3¾x5¼	36x4	36x7	W
Triumph, HC	1½	2550	3¾x5¼	36x3½	36x5	W
Triumph, G	1	1995	3⅝x5⅛	34x5†	34x5†	W
Twin City, B.W.	2	3000	4 x5½	36x4	36x7	I
Twin City, A. W.	3½	4400	4¼x6	36x5	40x5d	W
Twin City, FWDB	3½	4750	5½x6	36x6	36x6	I
Twin City, FWDA	5	5250	5½x6	36x7	36x7	I
Ultimate, A	2	3200	4 x5½	36x3½	36x5*	W
Ultimate, AJ	2	3250	4¼x5½	35x5†	38x7†	W
Ultimate, B	3	3750	4¼x5½	36x4*	36x4d*	W
Ultimate, BL	3	3850	4¼x5½	36x4*	36x4d*	W
Union, F W	2½	3490	4 x6	36x5*	36x8*	D
Union, H W	4	4485	4½x6	36x6	40x12	D
Union, J W	6	5800	5 x6	36x6	40x14	D
United, A	1½	2445	3¾x5¼	36x3½	34x5*	I
United, B	2½	3150	4¼x5½	36x4*	36x7*	I
United, C	3½	3975	4¼x5½	36x5	36x5d	I
United, V	5	5100	4½x6	36x6	40x6d	I
U. S., N	1½	2475	3¾x5	36x3½	36x5*	I
U. S., R	3	3795	4 x5¼	36x4	36x4d	W
U. S., S	4	4595	4½x5½	36x5	36x5d	W
U. S., T	6	5850	4¾x6½	36x6	40x6d	W
Velie, 46	1½	2200	3¾x5	36x3½	36x5	I
Veteran**	1-1½	3500	3¾x5¼	36x6†	36x6‡	W
Veteran**	2-2½	4000	4¼x5½	36x4*	36x7*	W
Veteran**	2½-3	4400	4¼x5½	36x4*	36x7*	W
Veteran	3½-4	5600	4¼x6	36x5	36x5d	W
Victor, A	1½	2050	3¾x5	34x4	34x5	I
Vim, 29	½	1355	3½x4½	31x4†	31x4†	W
Vim, 31	1	2475	3¾x5⅛	35x5†	35x5†	W
Vim, 22	2	3150	3¾x5⅛	36x4	36x6	W
Vim, 23	3	3950	4¼x5½	36x5	36x5d	W
Vulcan, 25	2½	4000	4¼x6	36x4	36x8	W
Vulcan, 25P	3	4800	4¼x6	36x6	40x8	W
Walker-Johnson,B	2½	3500	4¼x5½	36x4	36x8	W
Walter, S	5	5600	4½x6½	36x5	40x6d	I
Waltham, E	1½	2350	3¾x5½	36x6†	38x7†	W
Ward-LaF., 2B	2½	3590	4⅜x5¾	36x4	36x7	W
Ward-LaF.,4A	3½	4690	4½x6¼	36x5	36x5d	W
Ward-LaF., 5A	5	5590	5 x6¼	36x6	36x6d	W
Watson, B	1	1865	3¾x5¼	34x4½†	34x4½†	W
Watson, N	3½	4250	4½x5½	36x5	36x10	W
Western, W1½	1½	2550	4½x5¼	36x3½*	36x5*	W
Western, L1½	1½	2550	3¾x5	36x3½*	36x5*	W
Western, W2½	2½	3250	4½x5¼	36x4	36x7	W
Western, L2½	2½	3250	4¼x6	36x4	36x7	W
Western, W3½	3½	4250	4½x6	36x5	40x5d	W
White, 15	¾	2600	3¾x5½	34x5†	34x5†	B
White, 20	2	3450	3¾x5½	36x4	36x7	D
White, 40	3½	4500	3¾x5¾	36x5	40x5d	D
White, 45	5	5000	4¼x5¾	36x6	40x6d	D
White, Hick., E	1	2450	3¾x5	34x5†	34x5†	W
White, Hick., H	1½	2750	3¾x5	36x3½	36x5	W
White Hick., K	2½	3350	4½x5¼	36x4	36x7	W
Wichita, K	1	2300	3½x5	36x3*	36x4*	W
Wichita, L	1½	2600	3¾x5¼	36x3½*	36x5*	W
Wichita, M	2	2800	3¾x5¼	36x3½*	36x6*	W
Wichita, R	2½	3000	3¾x5¼	36x4*	36x7*	W
Wichita, RX	2½	3600	4¼x6	36x4*	36x8*	W
Wichita, O	3½	4000	4¼x6	36x5*	36x5d*	W
Wichita, S	5	5000	4½x6	36x6	40x6d	W
Wilcox, AA	1	2100	3¾x5½	36x4*	36x4*	W
Wilcox, B	1½	2775	4¼x5	36x4	36x5	W
Wilcox, D	2½	3300	4¼x5	36x4*	36x3½d*	W
Wilcox, E	3½	4250	4½x6	36x5*	36x5d*	W
Wilcox, F	5	5200	4¾x6½	36x5	40x6d	W
Wilson, F	1½	2650	3¾x5	36x3½	36x5	W
Wilson, EA	2½	3300	4½x5¼	36x4	36x7	W
Wilson, G	3½	4300	4½x5½	36x5	36x5d	W
Wilson, H	5	5275	4½x5½	36x6	40x6d	W
Winther, 751	¾	1795	3½x5	34x4½†	35x5†	I
Winther, 109	1½	2850	3¾x5	32x4	32x4	I
Winther, 430	1½	2450	3¾x5	34x3½	34x5	I
Winther, 39	2	3250	4 x5	34x4	34x4d	I
Winther, 49	2½	3690	4 x5	34x5	36x6	I
Winther, 450	3½	4200	4 x6	36x5	36x5d	I
Winther, 109	5	5250	4½x6	36x6	40x5d	I
Winther, 140	7	5900	5 x6	36x6	40x7d	I
Witt-Will, N	1½	2750	3¾x5	36x3½*	36x5*	W
Witt-Will, P	2½	3250	4½x5¼	36x3½*	36x7*	W
Wolverine, C	1½	2380	3¾x5	34x3½	34x5	I
Wolverine, D	2	2650	3¾x5	34x4	34x7	I
Wolverine, L	3½	4150	4½x5½	36x5	36x10	I

*2-cyl. †6-cyl. ‡8-cyl. All others, not marked, are 4-cyl. Kelly-S., Kelly-Springfield. Trac., Tractor. **Canadian made.
Final Drive: W—Worm, I—Internal Gear, C—Chains, D—Double Reduction. B—Bevel. 4—Four-Wheel, E—External Gear. *Tires—optional. †Pneumatic Tires. All others solid. ††—Price includes body. ‡—Price includes several items of equipment.

*Nelson Le Moon

Farm Tractor Specifications and Prices

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Plow Capacity
All-In One	12-25	$1975	3	Weid.	4-3¾x5½	GDK	2-3
Allis-Chalm..B	6-12	925	..	....	.....	...	..
Allis-Chal.G.P	6-12	850	2	LeR.	4-3½x4½	Gas.	1-2
Allis-Chalm...	12-20	1495	..	Mid.W	4-4½x5½	Gas.	2-3
Allis-Chalm...	18-30	2150	4	Own	4-4¾x6½	GorK	3-4
Allis-Chalm...	10-18	875	4	Own	4-4¾x6½	G,K	4
Allwork...2-G	14-28	....	4	Own	4-4¾x6	GorK	3
Allwork.....C	14-28	....	4	Own	4-5 x6	GorK	3
AndrewsKin.D	18-36	2500	4	Clim.	4-5 x6½	GorK	4
Ane.....A	3-5	....	4	Own	1-4½x5	Gas.	..
Appleton.....	12-20	1500	4	Buda	4-4¼x5½	G,K	2-3
Aultman-T.....	15-30	....	4	Clim.	4-5 x6½	G,K	4
Aultman-T.....	22-45	....	4	Own	4-5½x8	G,K	6
Aultman-T.....	30-60	....	4	Own	4-7 x9	G,K,D	8
Automot. B-3.	12-24	1785	4	Hero'ls	4-4 x5½	Gas.	2-3
Avery.SR.Cul.	5-10	....	4	Own	4-3 x4	G,K	..
Avery..Cult-C	.....	....	3	Own	6-3 x4	G,K	..
Avery.....B	5-10	....	4	Own	4-3 x4	G,K	2
Avery.....C	....	....	4	Own	6-3 x4	G,K	..
Avery.....	8-16	....	4	Own	2-5½x6	G,K,D	2-3
Avery.....	12-25	....	4	Own	2-6½x7	G,K,D	3-4
Avery.....	14-28	....	4	Own	4-4½x7	G,K,D	3-4
Avery.....	18-36	....	4	Own	4-5½x6	G,K,D	4-5
Avery.....	25-50	....	4	Own	4-6½x7	G,H,D	5-6
Avery.....	45-65	....	4	Own	4-7¾x8	G,K,D	8-10
Bates All St...	15-25	....	4	Own	4-4¼x6	Ker.	3
Bates.....S.M.	15-22	....	*4	Own	4-4¼x6	G,K,D	3
Bates Mule..F	18-25	....	*2	Midw	4-4¼x5¼	Gas.	3
Bates Mule..H	15-25	....	4	Midw	4-4¼x5¼	Gas.	3
Bates Mule..G	25-35	....	*2	Midw	4-4½x6	Gas.	com.
Bean.....	8-16	....	*1	Own	14-3½x4	G,K	2-3
Beeman.....G	2-4	340	4	Own	1-3½x4½	Gas.	½
Best.....30	20-30	3250	*2	Own	4-4¾x6½	G,K,D	4
Best.....60	35-60	5750	*2	Own	4-6½x8	G,K,D	8-9
Boring...1921	....	1850	3	Wauk	4-4¾x5¾	GorK	2
Bull.....	12-24	1200	3	Toro.	2-5½x7	G,K	3
Burn-Oil.....	15-30	1650	4	Own	2-6¾x7	Ker.	3
Capital.....	15-30	1000	2	Own	4-4¾x6	Gas.	33
Case.....	10-18	1250	4	Own	4-3½x5	GorK.	2
Case.....	15-27	1865	4	Own	4-4½x6	GorK	3
Case.....	22-40	3350	4	Own	4-5½x6¾	GorK	4-5
Caterpillar T11	25	....	*2	Own	4-4¾x6	Gas.	4
Caterpillar T16	40	....	*2	Own	4-6¼x7	Gas.	6
Chase.....	12-25	....	3	Buda	4-4¼x5½	GorK	2-3
Cletrac.....W	12-20	1495	*2	Own	4-4 x5½	G,K,D	2-3
Dakota.....4	15-27	1750	3	Dom.	4-4¾x6	Gas.	3
Dart.....B.J.	15-30	....	4	....	4-4½x6	Gas.	3-4
Depue.....A	20-30	2500	4	Buda	4-4½x6	Gas.	4
Dill.....D	20	2480	4	Cont.	4-4½x5½	Gas.	3
De-It-All.....	4-6	595	..	Own	1-4½x5	Gas.	5-6
Eagle.....F	12-22	1390	4	Own	2-7 x8	GorK	3-4
Eagle.....F	16-30	1850	4	Own	2-8 x8	GorK	4-5
E-B.....	12-20	....	4	Own	4-4¾x5	GorK	4
E-B.....Q	12-20	....	4	Own	4-4¾x5	GorK	3
E-B.....D	16-32	....	4	Own	4-5¼x7	GorK	4
E-BReeves....	40-65	....	4	Own	4-7¼x9	GorK	8-10
Evans.....	18-30	2000	4	Buda	4-4½x6	G,K	3
Fageol.....D	9-12	1525	4	Lyc.	4-3½x5	Gas.	2
Farm Horse...	18-30	1885	4	Clim.	4-5 x6½	G,K	3-4
Farquhar.....	15-25	....	4	Buda	4-4½x6	G,K,D	3-4
Farquhar.....	18-35	....	4	Own	4-6 x8	G,K,D	4-5
Farquhar.....	25-50	....	4	Own	4-7 x8	G,K,D	6-7
Fitch.....4	20-35	....	4	Clim.	4-5 x6½	GorK	3-4
Flour City....	20-35	....	4	Own	4-5¼x6	Ker.	4-6
Flour City....	30-50	....	4	Own	4-6¾x7	Ker.	6-8
Flour City....	40-70	....	4	Own	4-7½x9	Ker.	8-1
Fordson.....	.. 20	625	4	Own	4-4x5	G,K	2
Fox.....E	20-40	1300	4	Own	4-5½x7½	G or K	4
Franklin BullG	18-30	4000	*2	Clim.	4-5 x6½	G or K	3-3
Franklin Bull C	18-30	3350	*2	Clim.	4-5x6½	G or K	3-4
Franklin Bull G 2	18-30	4350	....	....	.....	....	....
Frick.....A	12-20	....	4	Erd.	4-4 x6	G,K	2-4
Frick.....C	15-28	....	4	Beav.	4-4¾x6	G,K	3-4
G-O.....G	14-28	$1485	4	Wauk.	4-4½x5¾	GorK	3
Grain Belt..A	18-36	2150	4	Wauk	4-4¾x6¾	GorK	4
Gray.....1920	18-36	....	3	Wauk	4-4¾x6¾	Gas.	4
Ground Hog....	19-31	2000	4	Erd.	4-4 x6	GorK	3
Gt. Western St	20-30	1950	4	Beav.	4¾x6	K.	4
Hart-Parr..20	-20	1195	4	Own	2-5½x6½	K,D	3
Hart-Parr..30	15-30	1595	4	Own	2-6½x7	K,D	3
Heider.....D	9-16	....	4	Wauk	4-4½x5¾	G,K	2
Heider.....C	12-20	....	4	Wauk	4-4½x6¾	G,K	3
Heider...Cult	6-10	....	4	LeR.	4-3½x4½	Gas.	1
Hicks.....	20-30	....	4	....	4-4½x6	KorG	4
Huber Light 4	12-25	2500	4	Wauk	4-4½x5¾	GorK	3
Huber Super 4	15-30	1885	*2	Midw.	4-4½x6	Gas.	3
Illinois.....C	18-36	2500	4	Clim.	4-5 x6½	G,K	4
Imperial.....E	40-70	5000	4	Own	4-7½x9	G,K,D	10
Indiana.....F	5-10	....	4	LeR.	4-3½x4½	Gas.	1
International..	8-16	1000	4	Own	4-4½x5	G,K,D	2
International..	15-30	1950	4	Own	4-5½x8	G,K,D	4
J-T.....N	20-40	3485	*2	....	4-4¾x6	G,K	3-4
Keck-Gon....	15-30	1650	4	Own	2-7¼x8	G,K	3
Klumb.....F	16-32	....	4	Clim.	4-5 x6½	....	..
LaCrosse...M	7-12	900	4	Own	2-4 x6	G,K	1
LaCrosse...G	12-24	1250	4	Own	2-6 x7	GorK	3
Lauson.....	12-25	1495	4	Midw.	4-4½x5¼	Gas.	3
Lauson.....	15-30	1685	4	Beav.	4-4¾x6	GorK	3-4
Lauson.....21	15-30	1985	4	Beav.	4-4¾x6	GorK	3-4
Leader.....B	12-18	1095	4	Own	2-6 x6¾	G,K,D	2-3
Leader.....C	18-36	2650	2	Clim.	4-5 x7½	Ker	3-4
Leader.....N	16-32	1985	4	Clim.	4-5 x6½	G,K	3-4
Leader.....GU	18-35	2775	*	Clim.	4-5x6½	G,K	3-4
Leonard.....E	20-30	2530	4	Buda	4-4½x6	G,K	3
Liberty.....A	18-32	2475	4	Clim.	4-5 x6½	G,K	4
Little Bear....	4	850	4	Ford	4-3¾x4	Gas.	..
Little Giant..B	16-22	2200	4	....	4-4½x5	K.	4
Little Giant..A	26-35	3300	4	....	4-5½x6	K.	6
Lombard.....	85-150	....	*2	....	6-5½x6¾	Gas.	16
Motor Macult.	1½	225	2	Own	1-2¾x3½	Gas.	..
Magnet.....B	14-28	1875	4	Wauk	4-4½x6¼	K&G	3
Market.....	2-4½	....	..	Vur.	1-4 x4	Gas.	..
Master Jr.....	5-10	585	..	LeR.	-2¾x4	Gas.	1
MerryGar1921	2	230	2	Evin	1-2¾x2½	Gas.	..
Minne ..All-P	12-25	1325	4	Own	4-4½x7	GorK	3
Mohawk..1921	8-16	785	4	Light	4-3½x4½	KorG,	1-2
Moline Univ D	9-18	1075	2	Own	4-3½x5	Gas.	2-
Moline Orch..	9-18	1075	2	Own	4-3½x5	Gas.	2-3
Monarch B....	30-20	3400	*2	Beav.	4-4¾x6	G or K	4
Motox.....	15-30	2250	4	Buda	4-4½x6	Gas.	3-4
New Britain..1	3-6	425	4	Own	2-3¼x4	Gas.	¾
New Britain..2	3-6	425	4	Own	2-3¾x4	Gas.	¾
Nichols-Shep. 20-42	20-42	3100	..	Own	8 x10	GorK	3-6
Nichols Shep. 25-50	25-50	3460	..	Own	9 x12	GorK	4-7
Nilson Jr.....E	16-25	1595	4	Wauk.	4-4½x5¾	G or K	3
Nilson Senior.	20-40	2675	5	Wauk	4-5 x6¼	G,K	4
Oil Pull.....K	12-20	1785	4	Own	2-6 x8	K,D	3
Oil Pull.....H	16-30	2665	4	Own	2-7 x8½	K,D	4
Oil Pull.....G	20-40	3750	4	Own	2-8 x10	K,D	5-6
Oil Pull.....E	30-60	5275	4	Own	2-10x12	K,D	8-10
Oldsmar Gar..	2½-5	395	4	Own	1-5½x5½	G,K,D	⅔
Oliver.....A	15-30	....	*2	Beav.	4-4½x6	GorK	3-4
Once Over Tiller Mark..6	12-25	3000	4	Strns	4-4½x6	Gas.	2
Parrett.....K	15-30	1950	4	Pitt	4-4½x6	G,K	3
Peoria.....L	12-25	1785	4	Clim.	4-5 x6½	G,K	3
Pioneer.....G	18-36	....	4	Own	4-5½x6	G,K,D	4
Pioneer.....C	30-60	....	4	Own	4-7 x8	Gas.	10
Planet Jr.....	5-10	950	2	LeRoi	4	Gas	1
Plowman...A	15-30	1995	4	Buda	4-4½x6	G,K	3-4
Port Huron..A	12-25	1700	4	Chief	4-4¾x6	G,K	3
Post.....D	12-20	1800	4	Wauk	4-4¼x5¾	GorK	2
Prairie Dog..L	9-18	650	3	Wauk	4-3¾x5¼	Gas.	2
Prairie Dog..D	15-30	1250	4	Wauk	4-4½x6½	Gas.	3
Ranger Cul. TK-20	8-16	....	4	LeR.	4-3¼x4½	Gas.	1
Reed.....	15-30	2250	4	Dom	4-4¾x6	K.	3-4
Reed.....A-1	18-36	2400	4	Dom	4-5 x6	Gas.	3-4
Reliable.....	10-20	985	4	Own	2-6 x7	Ker.	2
Rex.....	12-25	1600	4	Wauk	4-4¼x5¾	GorK	3
Russell.....	12-24	....	4	Own	4-4½x5¾	GorK	2-3
Russell.....	15-30	....	4	Own	4-5 x6½	GorK	3 4
Russell.....	20-35	....	4	Own	4-5½x7	GorK	4-5
Russell.....	30-60	....	4	Own	4-8 x10	GorK	8-10
Samson....M	2	995	4	Nov.	4-4 x5½	G,K	2
Sandusky...J	10-20	1250	4	Own	4-4¼x5¼	G,K,D	2
Sandusky...E	15-35	1750	4	Own	4-5 x6½	G,K,D	4
Shawnee Com.	6-12	....	2	LeR.	4-3½x4½	Gas.	10
Shawnee Com.	9-18	....	2	Gray	4-3½x5	....	..
Shelby.....C	10-20	....	4	Erd.	4-4 x6	GorK	2-3
Shelby.....D	15-30	....	4	Beav.	4-4¾x6	G,K	3
Short Turn....	20-40	1500	3	....	4-4¾x6	G,K	3
Square T....A	18-35	2075	3	Clim.	4-5 x6½	K,G	3
Steady Pull...	12-23	1485	4	....	4-4 x5	Gas.	3
Stinson....4E	18-36	1835	4	Beav.	4-4¾x6	G,K	4
Stone.....	20-40	....	4	Beav.	.....	G,K	4
Tioga.....3	15-27	2625	4	Wisc.	4-4½x6	Gas.	3-4
Titan.....	10-20	1000	4	Own	2-6½x8	G,K,D	3
Tillermo....A	2-6	385	..	Vur.	1-4 x4	G,K	..
Topp.....B	30-45	4000	4	Wauk	4-4¾x6¾	Gas.	3-4
Toro..Tractor	6-12	950	4	LeR.	4-3½x4½	Gas.	2
Townsend....	10-20	....	2	Own	4-6½x7	Ker	2-3
Townsend	15-30	....	2	Own	4-7 x8	Ker	3-4
Townsend	25-50	....	2	Own	4-8½x10	Ker	4-8
Traylor....TB	6-12	815	4	LeR.	4-3½x4½	Gas.	1
Triumph....H	18-36	2450	2	Erd.	4-4¾x6	Ker.	4
Trundaar...10	25-40	4250	*2	Wauk	4-5 x6¼	GorK	4
Turner...1921	14-25	1295	4	Buda	4-4¼x5½	G,K	3
Twin City.....	12-20	....	4	Own	4-4¼x6	G,K	3
Twin City.....	20-35	....	4	Own	4-5½x6¾	G,K	5
Twin City.....	40-65	....	4	Own	4-7¾x9	G,K	8
Uncle Sam C20	12-20	1385	4	Wid	4-4 x5½	G or K	2-3
Uncle Sam B19	20-30	2300	4	Beav.	4-4¾x6	G or K	3-4
Uncle Sam D21	20-30	2075	4	Beav.	4-4¾x6	G or K	3-4
Universal.....	1-4	475	2	Own	1-3½x5	G	1
Utilitor....501	2½-4	380	4	Own	1-3½x4½	G	5-6
Velie..Biltwell	12-24	1750	4	Own	4-4½x5½	G,K,D	3
Victory...1921	9-18	1350	4	Gray.	4-3½x5	Gas.	2
Victory...1921	15-30	1750	4	Wauk	4-4¼x5¾	Gas.	3
Vim.....B	15-30	1650	4	Wauk	4-4½x5¾	G,K	3
Wallis.....K	15-25	1600	4	Own	4-4¼x5¾	G,K	3
Waterloo...N	12-25	....	4	Own	2-6½x7	G,K	3
Webfoot....40	25-40	4000	..	....	.....	....	..
Webfoot....53	28-53	5250	*2	Wisc.	4-5¾x7	G,D	6
Wellington..B	12-22	....	4	Erd.	4-4 x6	Ker.	2-3
Wellington..F	16-30	....	4	Chief	4-4¾x6	Ker.	3-4
Western. 1920	16-32	2100	4	Clim.	4-5x6½	Gas.	4
Wetmore.....	12-25	1650	4	Wauk	4-4 x5¾	G,K	2-3
Wharton....E	12-20	1800	3	Gray	4-3¾x5	Gas.	2
Whitney.....	9-18	1175	4	Own	2-5½x6½	Gas.	2
Wichita.....T	15-30	2500	4	Bear.	4-4½x6	G,K,D	3-4
Wisconsin...E	16-30	2250	4	Clim.	4-5 x6½	G,K,D	4
Wisconsin...H	22-40	2960	4	Clim.	4-5½x7	Ker.	5
Zelle.....	12-25	....	4	....	4-4½x5½	GorK	3

ABBREVIATIONS; G—Gasoline. K—Kerosene. D—Distillate. Plow capacity varies in relation to operating conditions. Figures are based on 14-in. plows. LeR.—LeRoi. Clim.—Climax. Beav.—Beaver. Dom.—Doman. Cont.—Continental. Wauk.—Waukesha. Wisc.—Wisconsin. T.C.—Twin City. Vur.—Vurac. Evin.—Evinrude. Midw.—Midwest. Weid.—Weideley. Com.—Commercial Tractor. *—Crawler type. All others are wheel type.

A SIMPLE FIXED PRICE PLAN

(Concluded from page 10)

much time the man spends on the car. This is a record for the company and enables the service manager to tell if his men keep under the bogy time allowed for standard operations.

An unusual system for ordering parts for the cars is kept in this establishment. The system eliminates the ordinary material requisition. Everything is based on the Telautograph, an electric device for reproducing handwriting at a distant point. A Telautograph is located in the stockroom and others are located for the use of the various shop foremen. Any foreman wanting parts writes his needs on the Telautograph and gives the job number that the parts is going into. The stockroom man makes out the ticket and sends it to the service manager's office where the records are kept. When the car is ready and all the forms are returned to the office the girl is able to add on the price for new parts.

Everything in this flat rate system and any other flat rate plan depends on how accurately the time limits are set for the various operations. Also the detailing of the operations and the splitting up of the various operations necessary to complete the job is important. We illustrate this by the example of valve grinding. The first thing to do when this task is started is to drain the water from the engine. Then the hose connections are removed. Very often the hose connections are renewed and this item must be figured in. Then the other accessories must be removed, such as a horn, perhaps, or a carbureter and a vacuum tank. Finally the head is removed, and now the valves are to be looked after. Already there has been a certain amount of time spent on the job and this must be figured in.

The above factors have been carefully considered by this company and every task has been detailed in the same manner. This is the reason that the system works as well as it does and the reason that owner complaints have been minimized.

In a future story on the flat rate system we will endeavor to tell how any dealer handling any make of car can lay out a flat rate system of his own.

APR 29 1921

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

Chattanooga, Tenn.	Annual Automobile Show	April
Red Bank, N. J.	Annual Automobile Show	April 16-23
Goldsboro, N. C.	Automobile and Industrial	April 20-23
Mexico City	Automobile Show	April 20-May 5
Waynesburg, Pa.	Automobile Show	April 21-24
Lincoln, Ill.	Automobile Show	April 21-29
Chicago	Used Automobile Show	May 7-15
Bangor, Me.	Automobile Show	May 9-14
Rocky Mount, N. C.	Annual Automobile Show	May 10-14
Cincinnati	Fall Automobile Show	Oct. 1-8

RACES

Indianapolis Speedway	500 Mile Race	May 30
Uniontown Speedway	Speedway Events	June 18
Cincinnati	Speedway Race (Possible)	July 4
Tacoma	Speedway Race	July 4
Le Mans	French Grand Prix	July 25
Elgin	Road Race (Possible)	August 3
Pikes Peak	Hill Climb	September 5
Uniontown Speedway	Annual Autumn Classic	September 5
Los Angeles	Speedway Race	November 24

FOREIGN SHOWS

Prague	Czecho-Slovak International Exposition	May 28, 1921
Basle, Switzerland	International Automobile Exhibition	May 28, June 8
Reykjavik, Iceland	Agricultural Machinery	June, 1921
Buenos Aires, Argentina	Passenger Cars and Equipment	September
Luxemburg	Luxemburg Agricultural Sample Exhibition	September
Paris, France	Paris Motor Show	Oct. 5-16
London	British Motor Show, Society Motor Mfrs. and Traders	Nov. 4-12

CONVENTIONS

Cleveland	National Foreign Trade Council	May 4-7
Buffalo	Convention of Factory Service Managers, Auspices of Service Committee, N. A. C. C.	May 17-19
West Baden, Ind.	Summer Meeting Society of Automotive Engineers	May 24-28
Mackinac Island, Mich.	Summer Meeting Automobile Equipment Association	July 4-9
Chicago	Twenty-eighth Annual Convention National Implement & Vehicle Association	Oct. 12-14

Business Notes

The Hartford Automotive Parts Co. is fast liquidiating its inventory and thus obtaining liquid capital. Merchandise creditors representing steel and machinery purchases and other lines are co-operating in the progress toward improved conditions. R. E. Carpenter of Boston, who has succeeded Jarvis McA. Johnson as president, reports that the shipments for March were the heaviest of any month since October.

The John Obenberger Forge Co., Milwaukee, has been placed in charge of the bankruptcy court under involuntary proceedings which have been followed by the filing of an admission of bankruptcy by the corporation. J. Frank Gerdis, recently elected secretary and treasurer, has been appointed receiver. The receivership is a friendly affair to prevent the dissipation of assets. Several plans of refinancing are under consideration.

The International Cultivator Corp., New York, has bid in the property of the Termaat-Monahan Mfg. Co., Oshkosh, Wis., at receiver's auction and intends to reopen the plant for the manufacture of gas engines, farm power units, lighting systems, etc.

The Simple Gas Engine Co., Menasha, Wis. has changed its corporate style to Menasha Clutch Pulley & Machinery Co. to better express the nature of its principal line of production.

The Alfred Reeke Co., Milwaukee, distributor of the Nash line, has changed its corporate title to the Reeke Nash Co. Alfred Reeke also has organized a new corporation, styled the Reeke Lafayette Co., to handle the distribution of the Lafayette in Wisconsin and upper Michigan.

The Diamond Tire & Supply Co., Milwaukee, formerly distributor of Diamond tires and goods, has changed its name to The Wisconsin Tire Corp. because of handling general lines of tires. W. H. Mason is secretary and general manager.

The French Battery & Carbon Co., Madison, Wis., is being reorganized on a larger and broader scale to take over the manufacture of a battery under patents owned by the Federal Battery Co., Cleveland. The French company will start work shortly on a large factory addition. Its new capitalization consists of $300,000 of common stock, $700,000 of first preferred and $1,000,000 of second preferred, both 8 per cent stock. It is understood that the Federal Battery Co. becomes owner of a larger block of the first preferred.

The Phelps Manufacturing Co., of Columbus, makers of the Phelps wire wheels for automobiles, which has been in the hands of J. H. Weisenback and Thomas W. Pickard as receivers for several months, is resuming operations at the factory in that city. For a time the plant was shut down but now with a revival in the demand for wheels production is starting up under the receivers. Some of the machinery is being disposed of and the remainder will be arranged to work out economies.

The Black and Decker Mfg. Co. will be represented in the South, effective immediately, by Thomas W. Peters, who has for the past fifteen years been located in Columbus, Ga. The southern territory includes all the southern states east of the Mississippi river and, in the very near future, a regular branch office will be established at Atlanta, where Mr. Peters will make his headquarters.

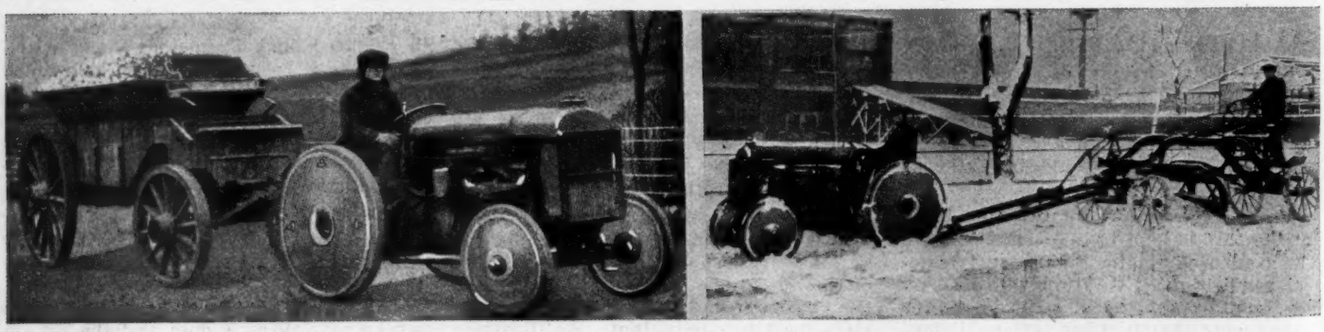
Spicer Mfg. Corp. reports for 1920 sales amounting to $17,862,929.94. Net profits after depreciation and deduction of interest were $1,448,752.79, with reduction of inventory to present prices and provision for federal taxes net profit was $646,022.08, equivalent to $21.33 on the preferred stock. Despite unfavorable conditions the company has paid the regular preferred dividends, a 50 per cent dividend on the common and has retired the first series of five year 5 per cent notes amounting to $600.000.

Kelsey Wheel Co. has declared the regular quarterly dividend of 1¾ per cent on the preferred stock, payable to stock of record April 23.

The Oakes Co. of Indianapolis, manufacturer of radiator cooling fans and other automobile parts, has acquired the sole license to manufacture and market automobile tire carriers under the Mather patent, No. 1324461, which covers the demountable feature of a tire carrier on a standard type of support bracket. The acquisition of the patent is one of the company's steps in the development of a plan which will broaden its manufacturing scope to include a wide range of automotive equipment.

The United States Motor Truck Co., Cincinnati, has declared the regular 1¾ per cent dividend on preferred stock, payable April 10.

Rubber Tread Tractor Wheels



The development of these wheels by Whitehead & Kales Co., Detroit, makes available the power and utility of the Fordson for pavements, roads and floors which formerly were barred to it. These tires also protect the tractor from jars and jolts. Where additional weight is required on the rear wheels to provide more traction they can be filled with concrete, sand, or other material. The rear wheels are constructed with hand holes for loading. This adds from 300 to 350 lb. per wheel depending on the material used. These wheels are of disk construction and the rear wheels have hooks for attaching anti-skid chains. Price of a set of four wheels, $250 and $16 a pair for extension rims